

EXHIBIT C



US005909492A

United States Patent [19]**Payne et al.**

[11] Patent Number:	5,909,492
[45] Date of Patent:	Jun. 1, 1999

[54] NETWORK SALES SYSTEM

[75] Inventors: **Andrew C. Payne**, Lincoln; **Lawrence C. Stewart**, Burlington, both of Mass.; **David J. Mackie**, Brookdale, Calif.

[73] Assignee: **Open Market, Incorporated**, Cambridge, Mass.

[21] Appl. No.: **08/878,396**

[22] Filed: **Jun. 18, 1997**

Related U.S. Application Data

[63] Continuation of application No. 08/328,133, Oct. 24, 1994, Pat. No. 5,715,314.

[51] Int. Cl.⁶ **H04L 9/00**

[52] U.S. Cl. **380/24; 380/23; 380/25; 380/49; 380/50; 705/26; 705/27; 705/39; 705/40; 705/44**

[58] **Field of Search** **380/4, 9, 21, 23, 380/24, 25, 49, 50; 235/379, 380; 705/26, 27, 39, 40, 41, 42, 43, 44, 14, 16**

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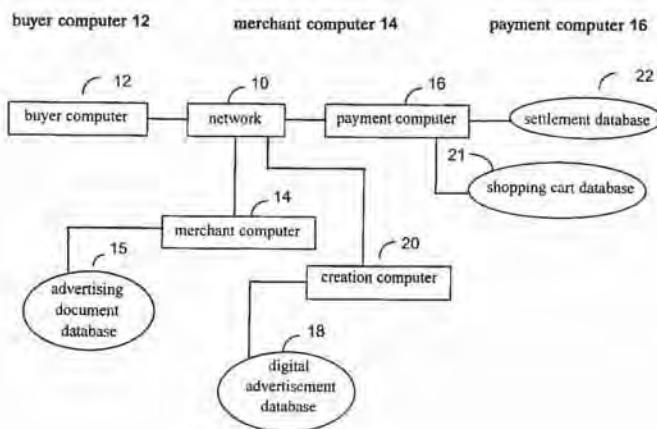
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Primary Examiner—Bernart E. Gregory
Attorney, Agent, or Firm—Fish & Richardson P.C.

[57] ABSTRACT

A network-based sales system includes at least one buyer computer for operation by a user desiring to buy a product, at least one merchant computer, and at least one payment computer. The buyer computer, the merchant computer, and the payment computer are interconnected by a computer network. The buyer computer is programmed to receive a user request for purchasing a product, and to cause a payment message to be sent to the payment computer that comprises a product identifier identifying the product. The payment computer is programmed to receive the payment message, to cause an access message to be created that comprises the product identifier and an access message authenticator based on a cryptographic key, and to cause the access message to be sent to the merchant computer. The merchant computer is programmed to receive the access message, to verify the access message authenticator to ensure that the access message authenticator was created using the cryptographic key, and to cause the product to be sent to the user desiring to buy the product.

38 Claims, 25 Drawing Sheets

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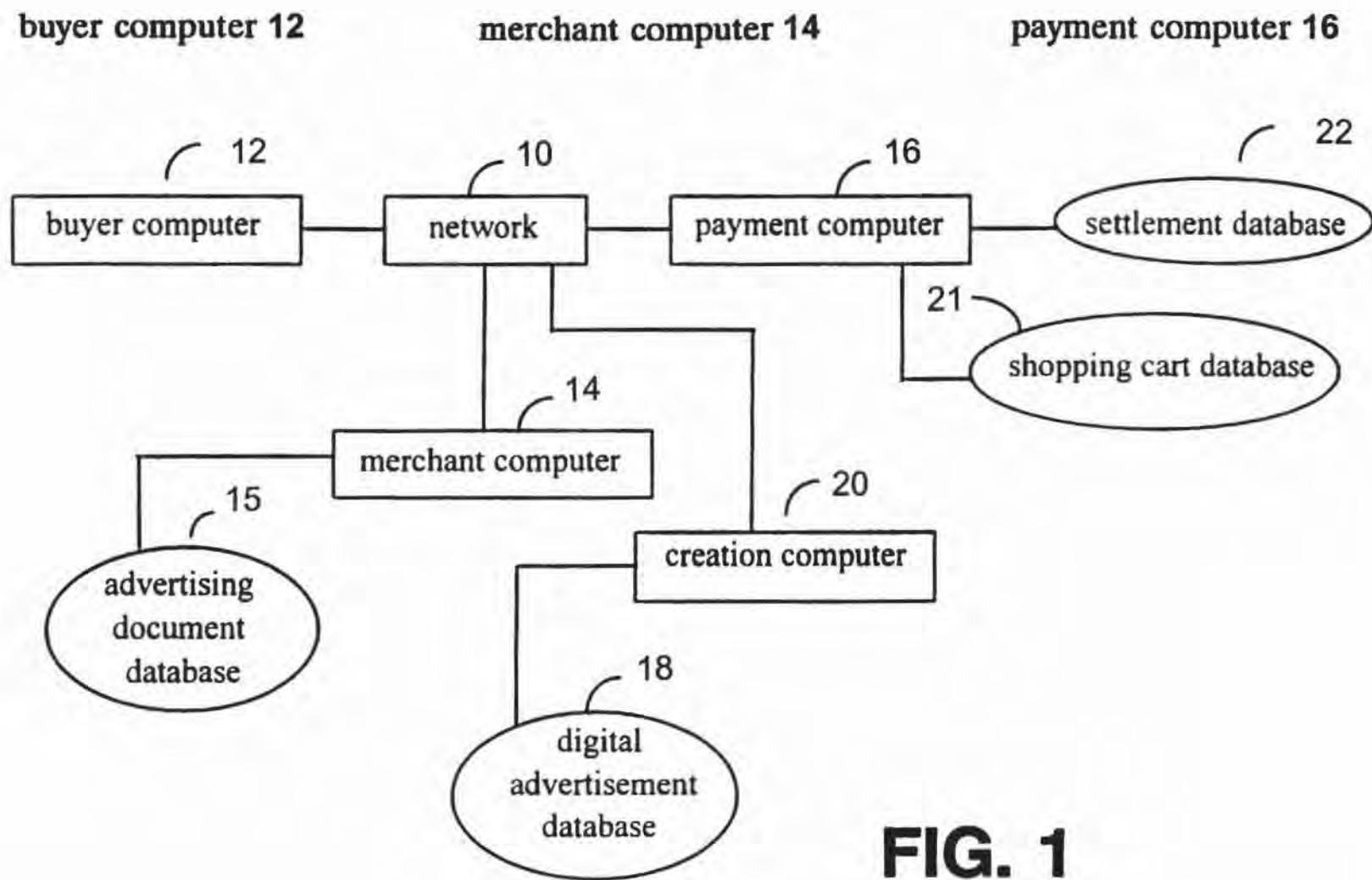
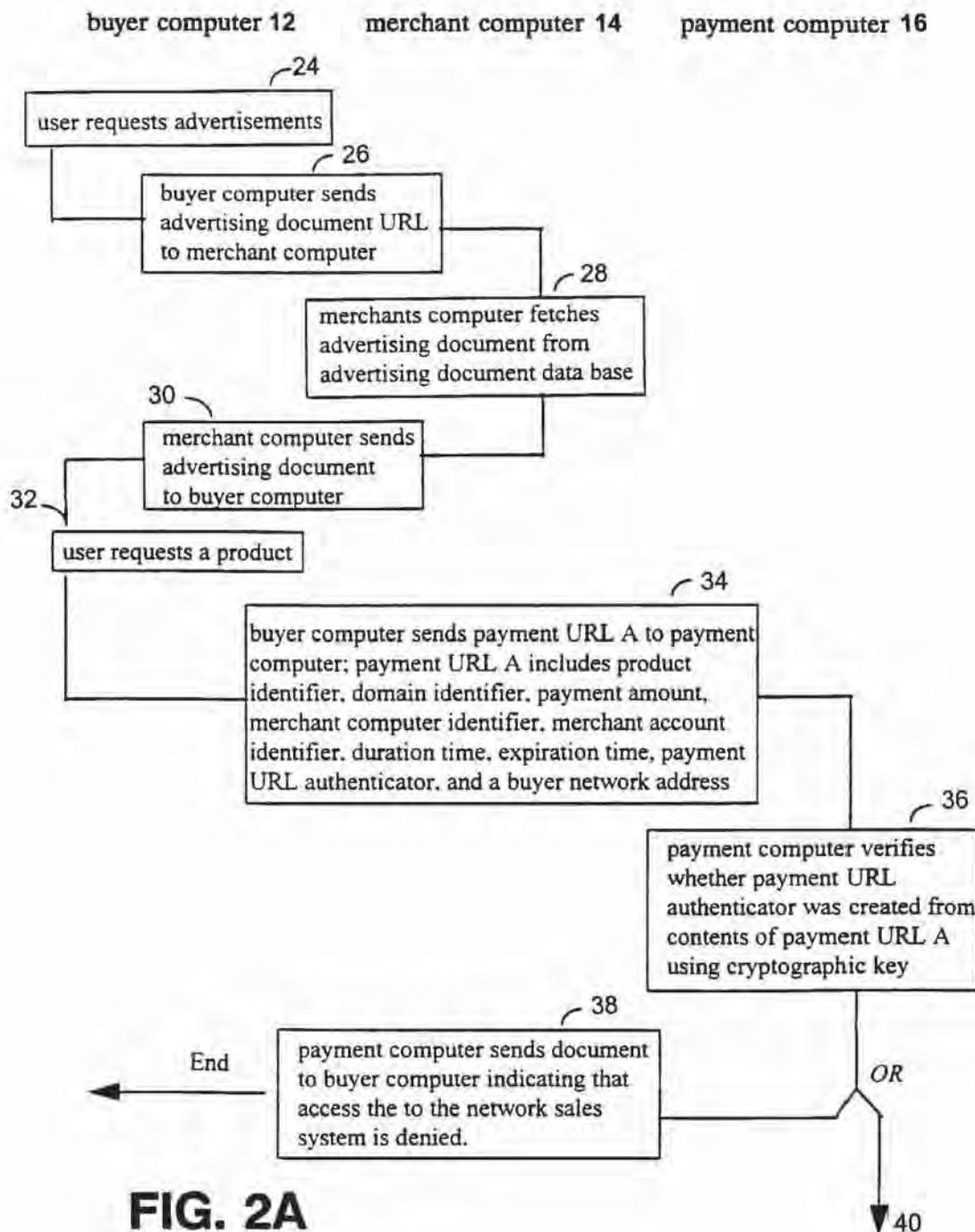


FIG. 1

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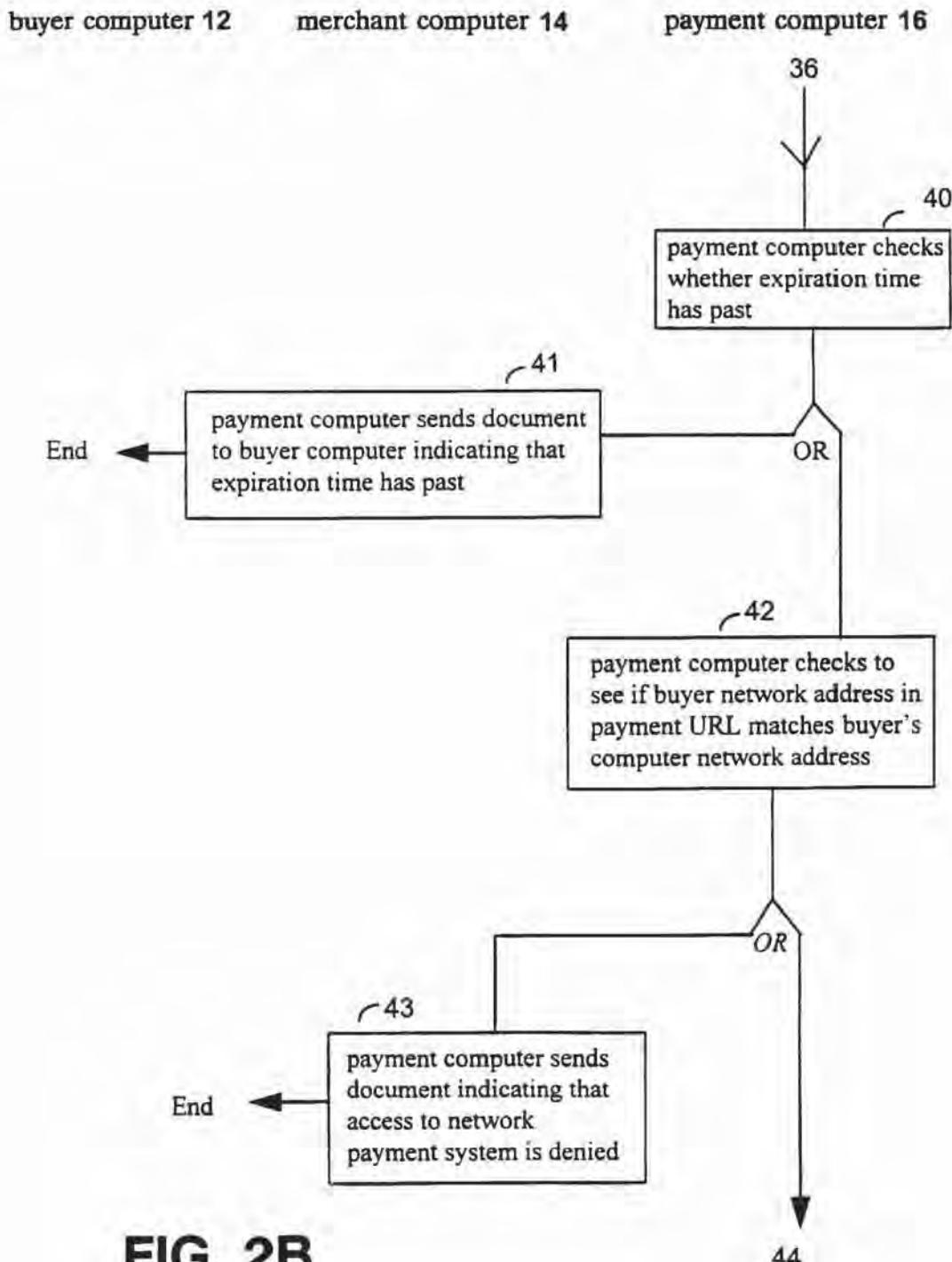
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5,909,492**FIG. 2A**

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5,909,492**FIG. 2B**

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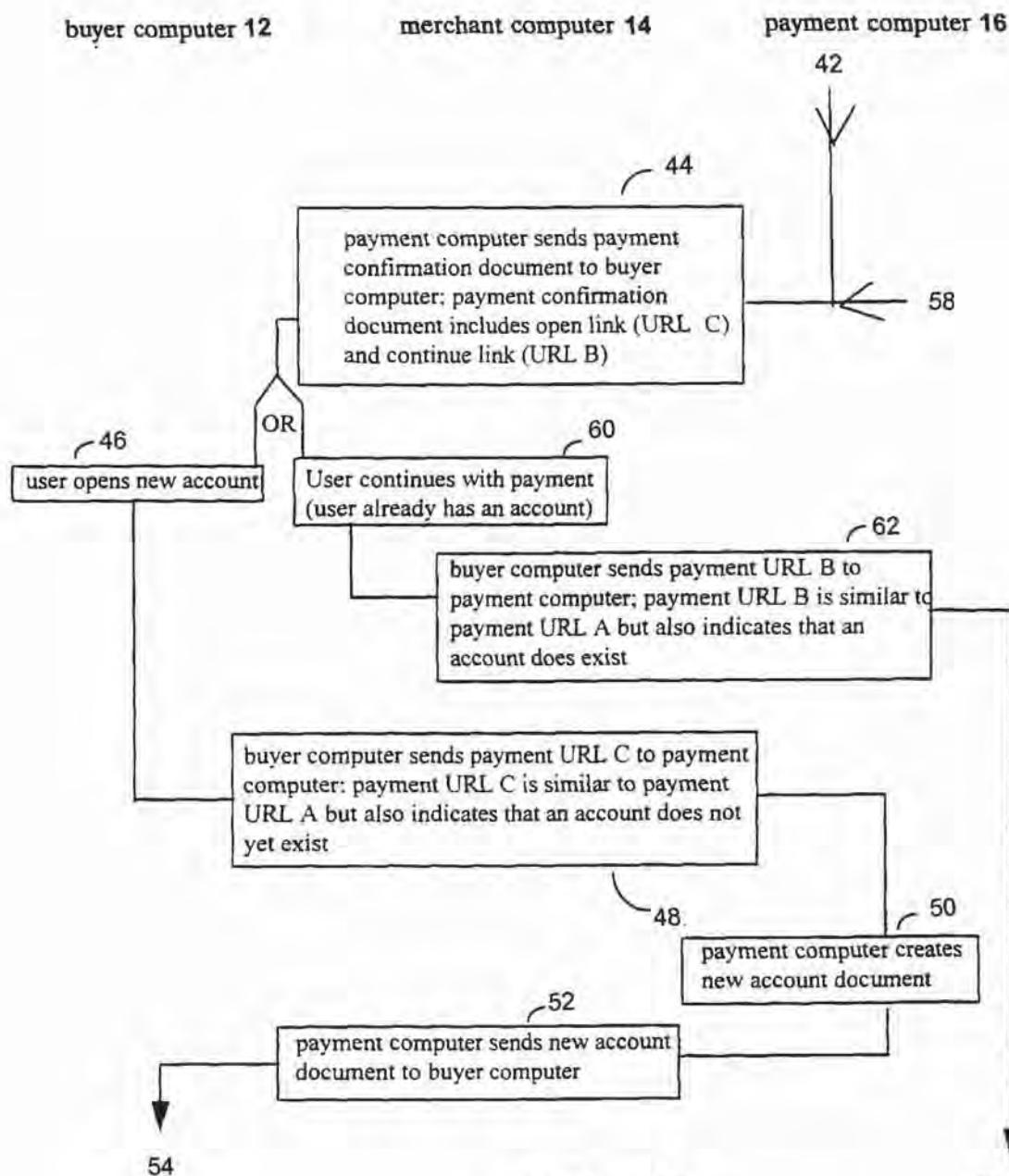
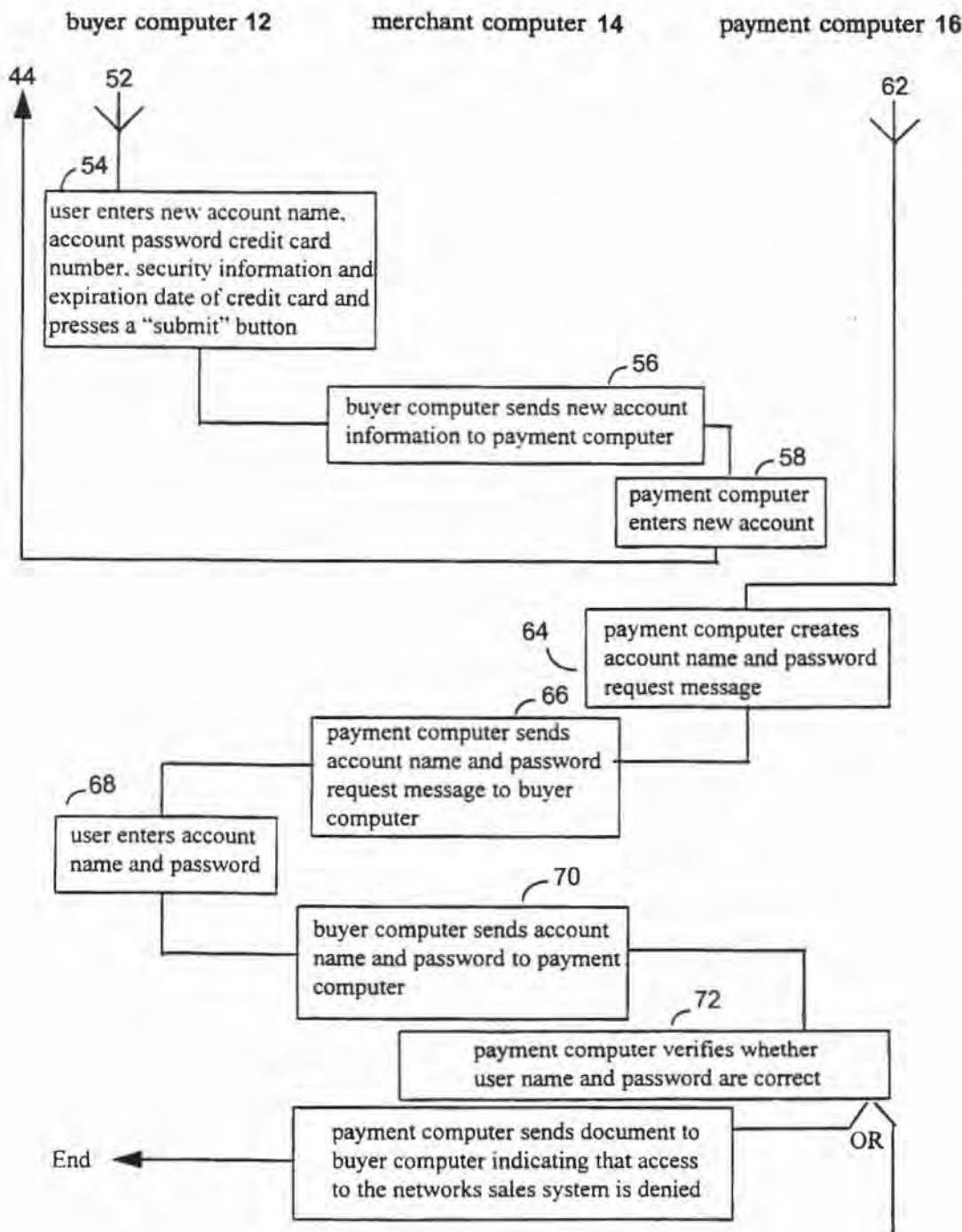


FIG. 2C

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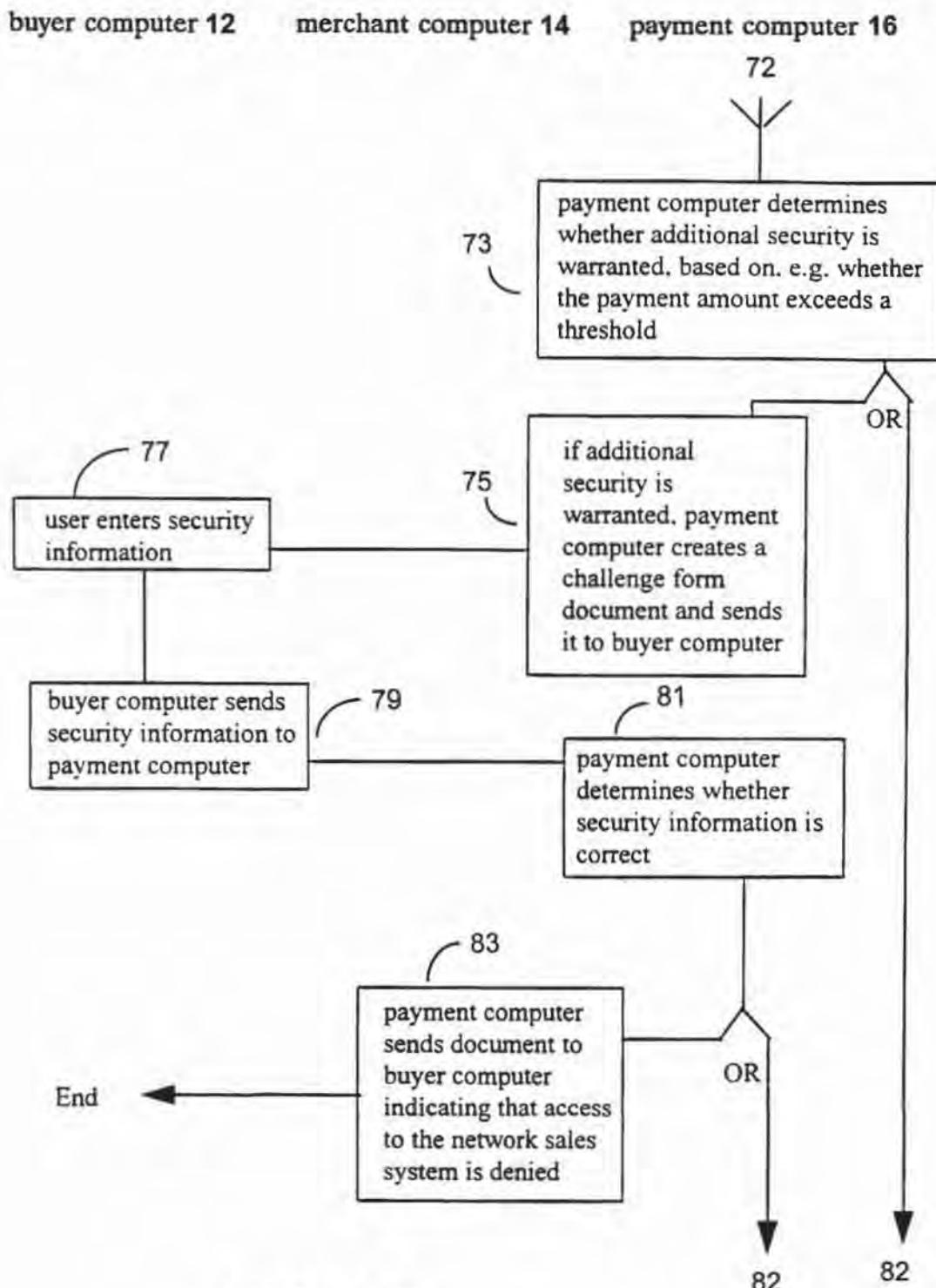
5,909,492**FIG. 2D**

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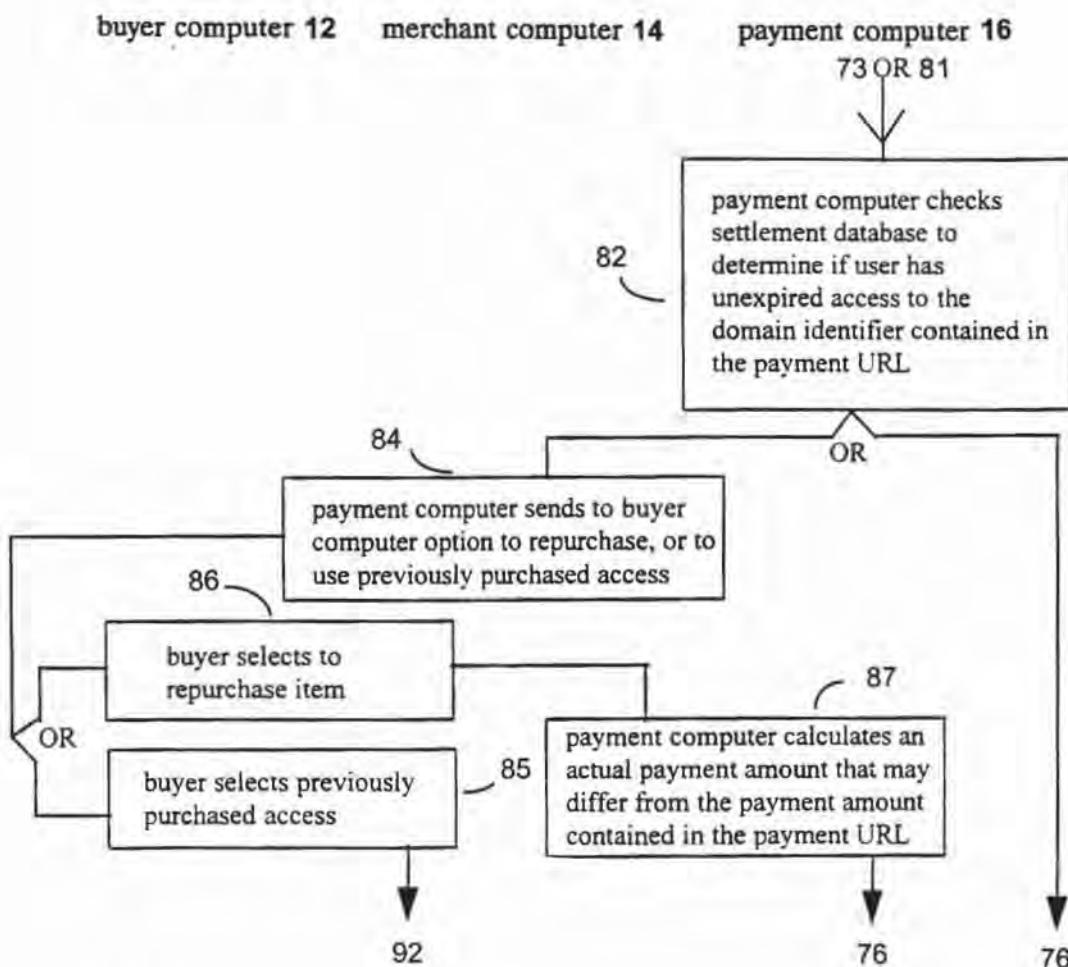
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**FIG. 2E**

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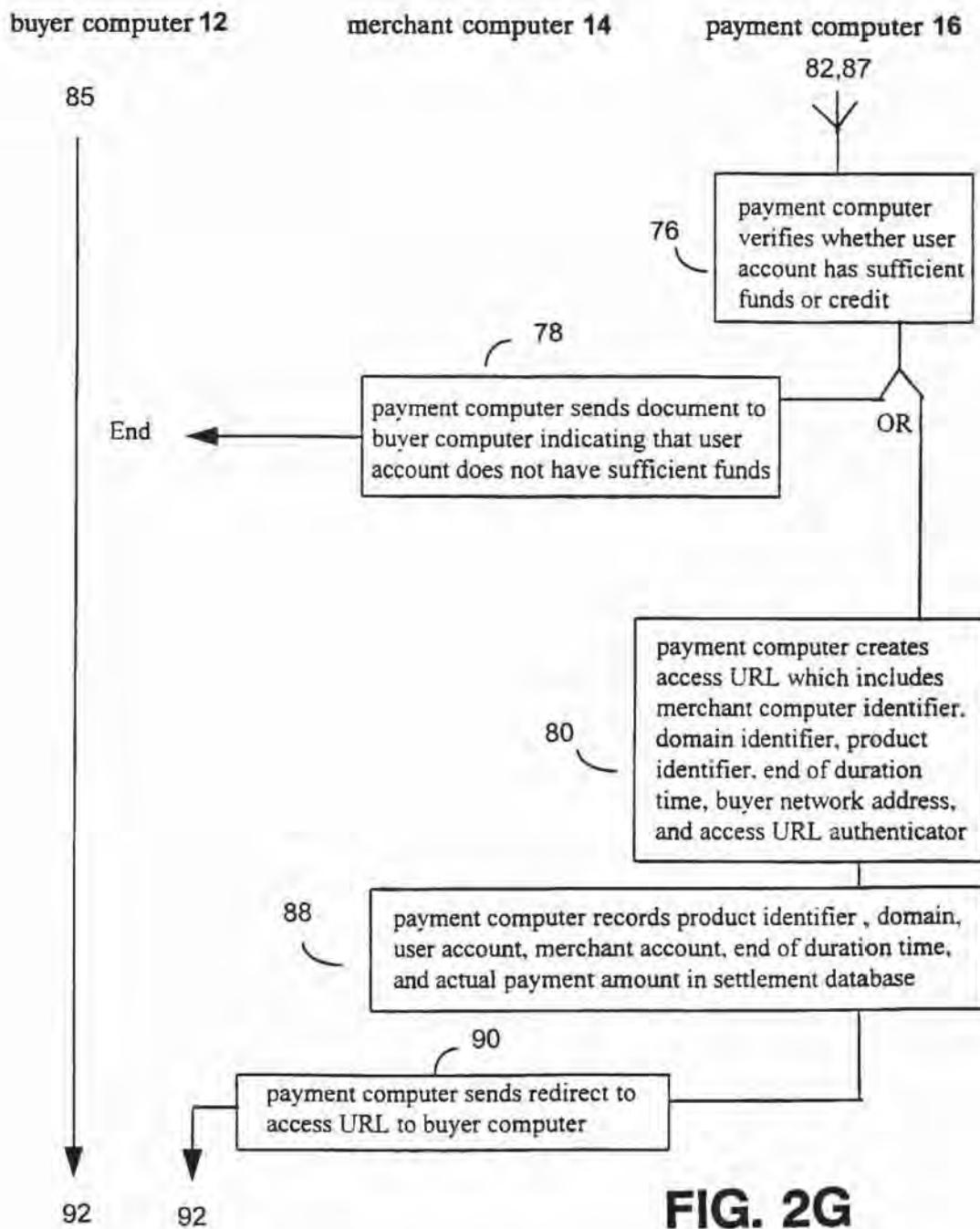
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5,909,492**FIG. 2F**

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5,909,492**FIG. 2G**

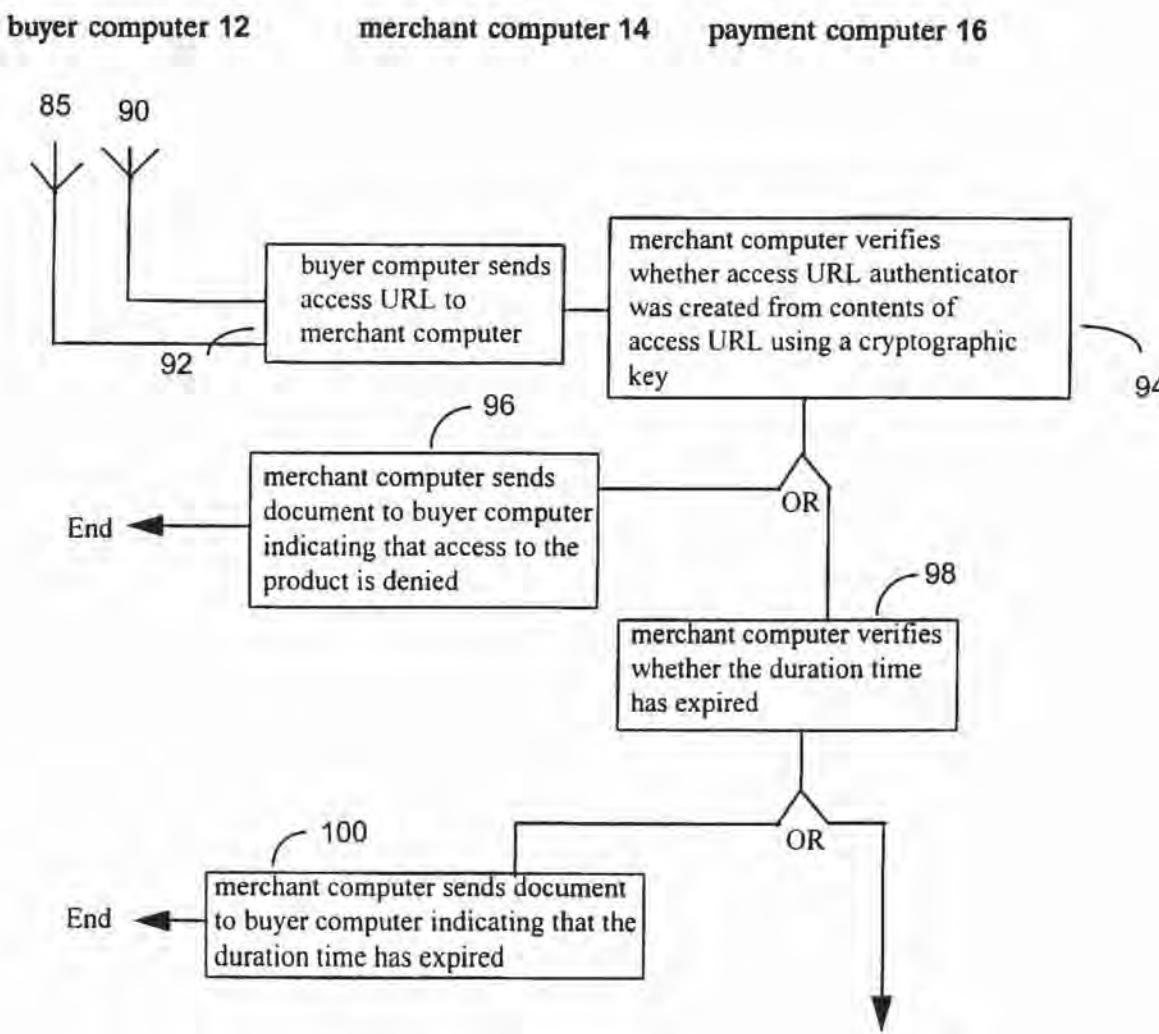
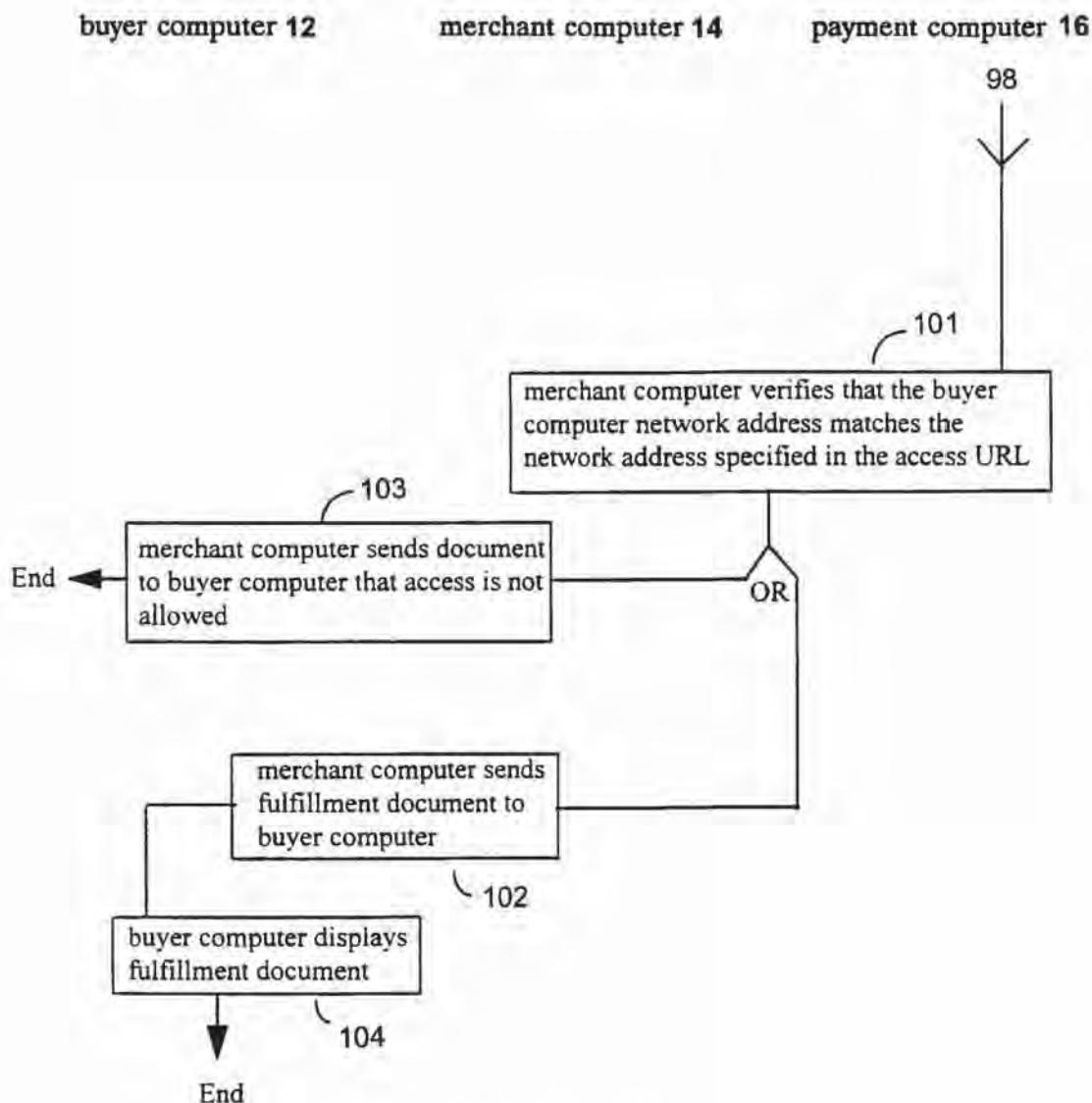


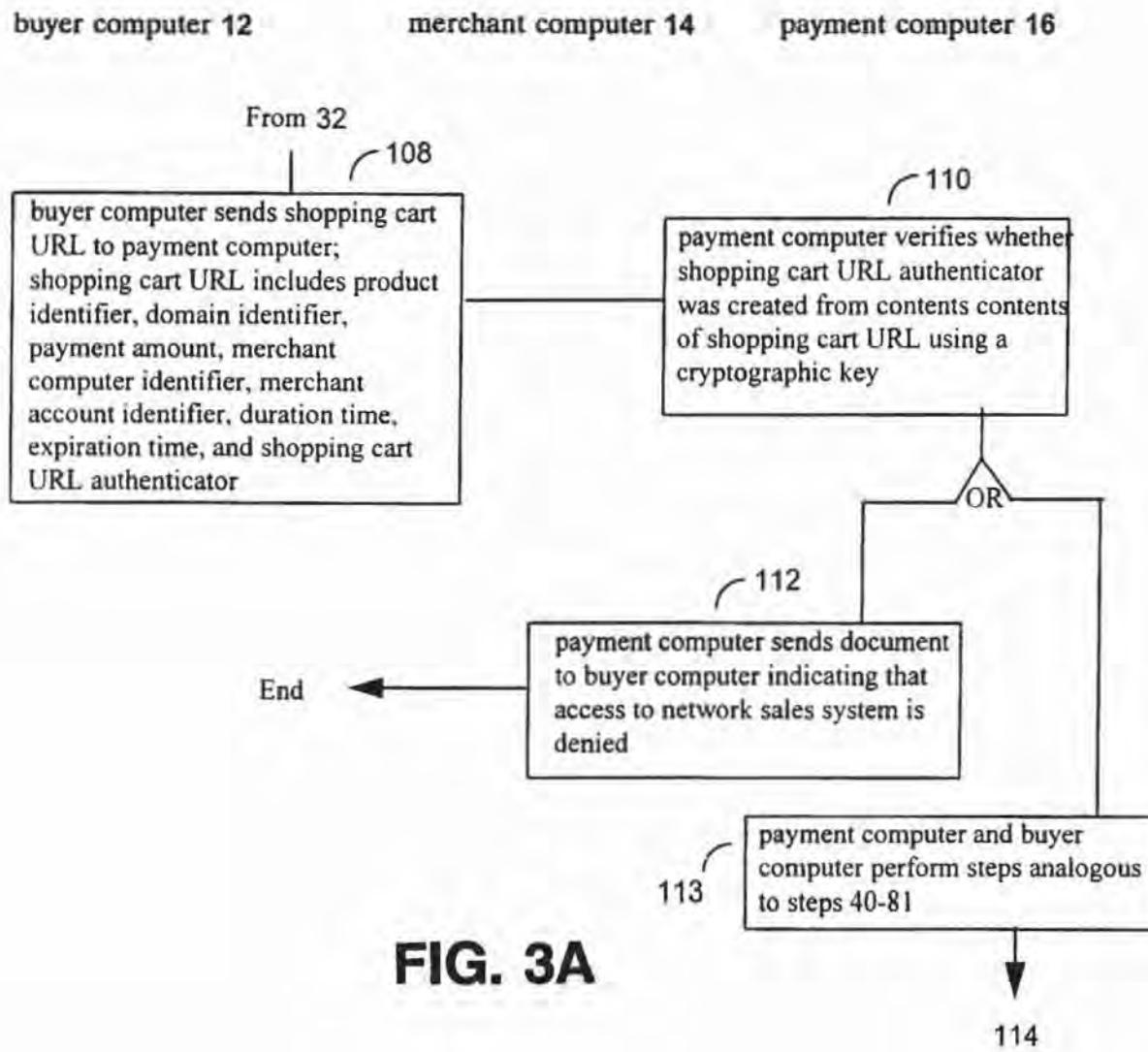
FIG. 2H

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5,909,492**FIG. 21**

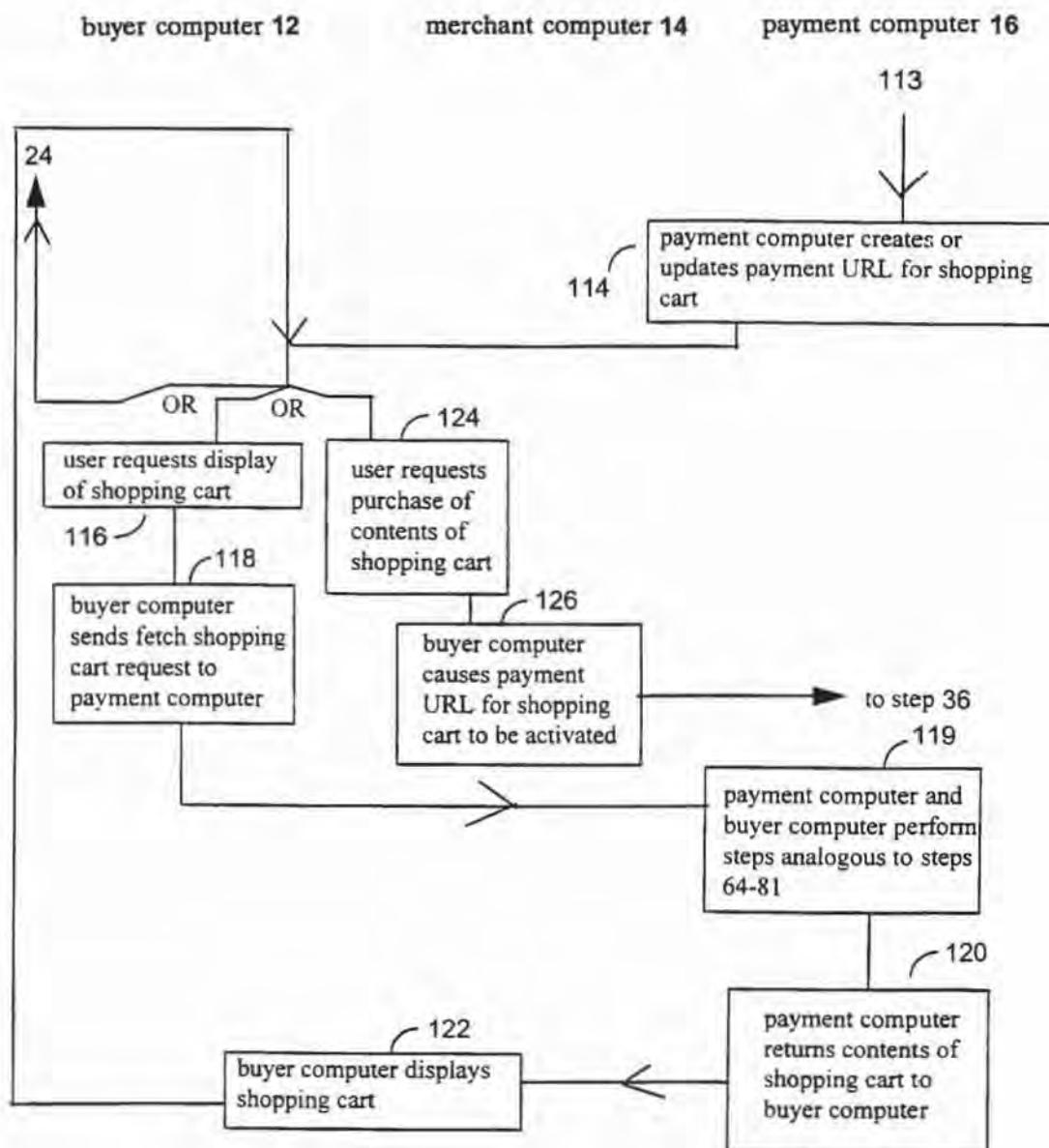


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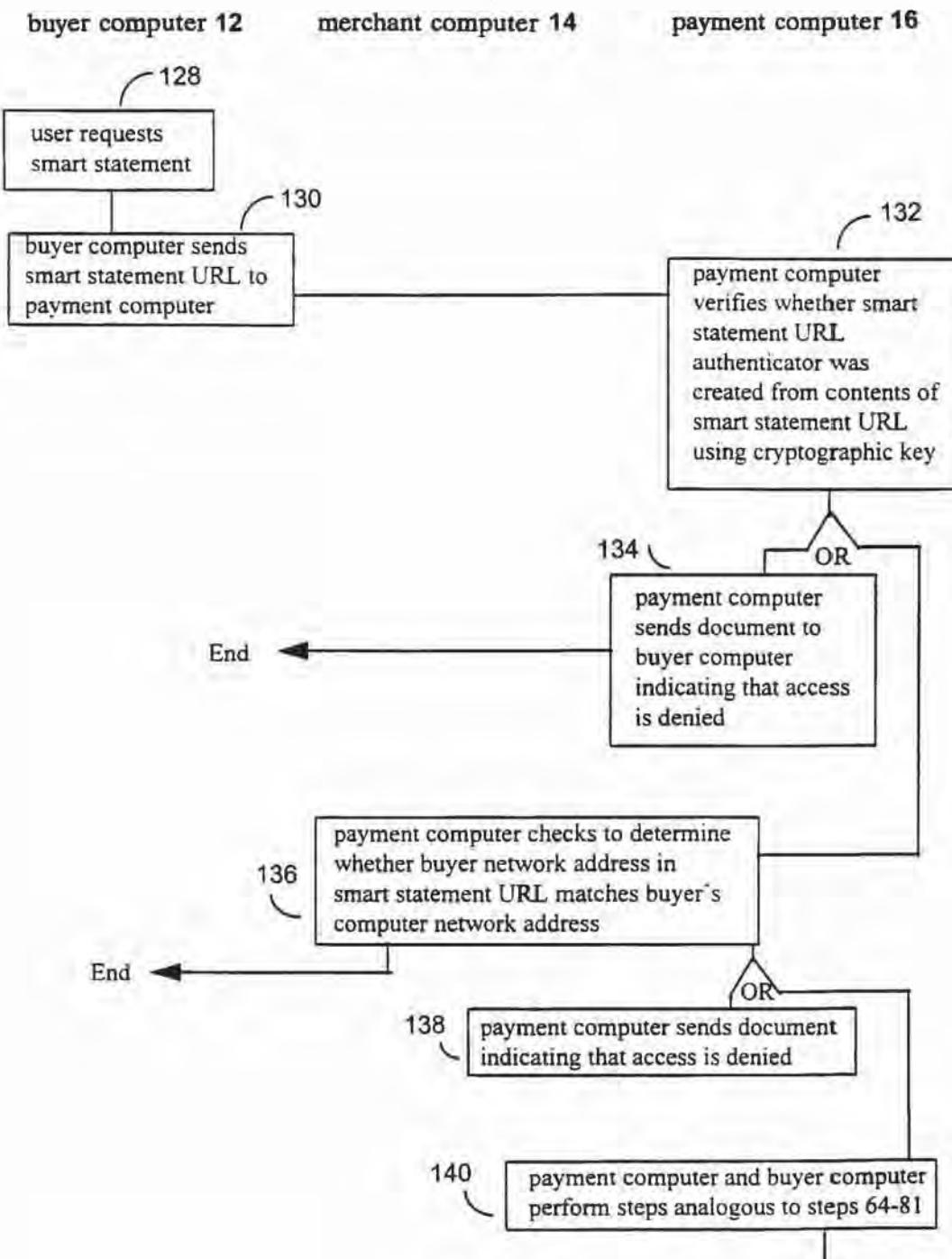
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**FIG. 3B**

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5,909,492**FIG. 4A**

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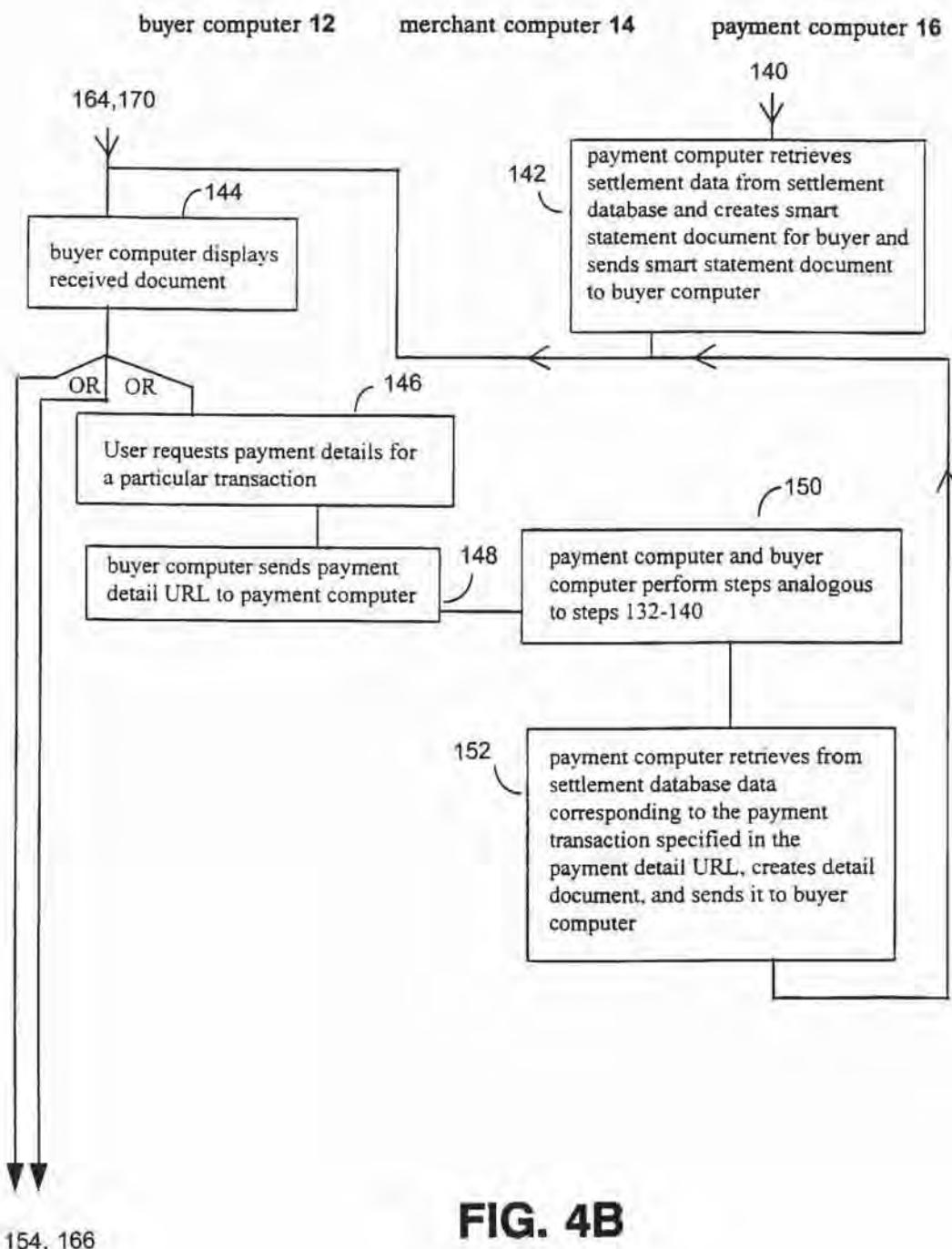
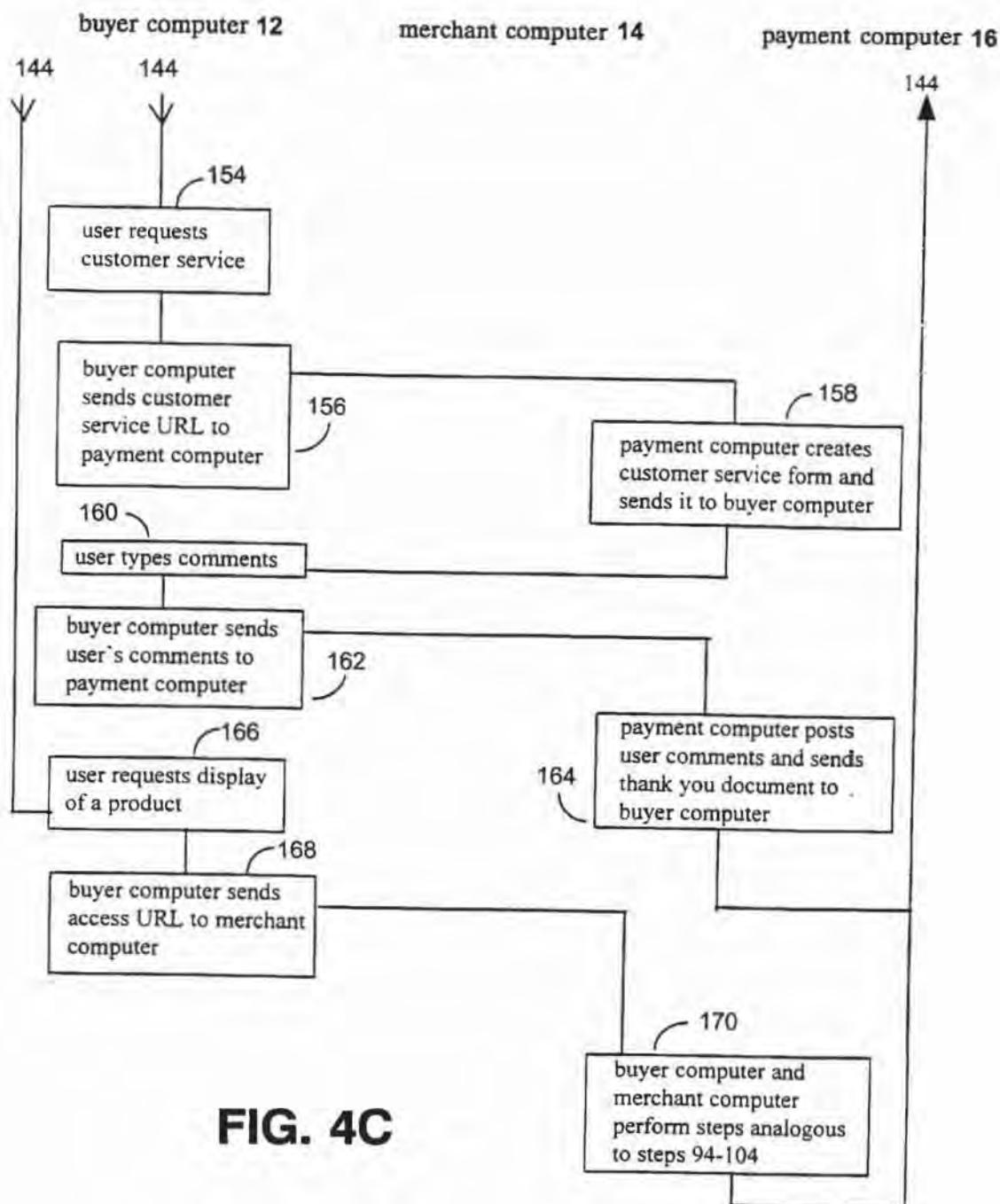


FIG. 4B

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5,909,492**FIG. 4C**

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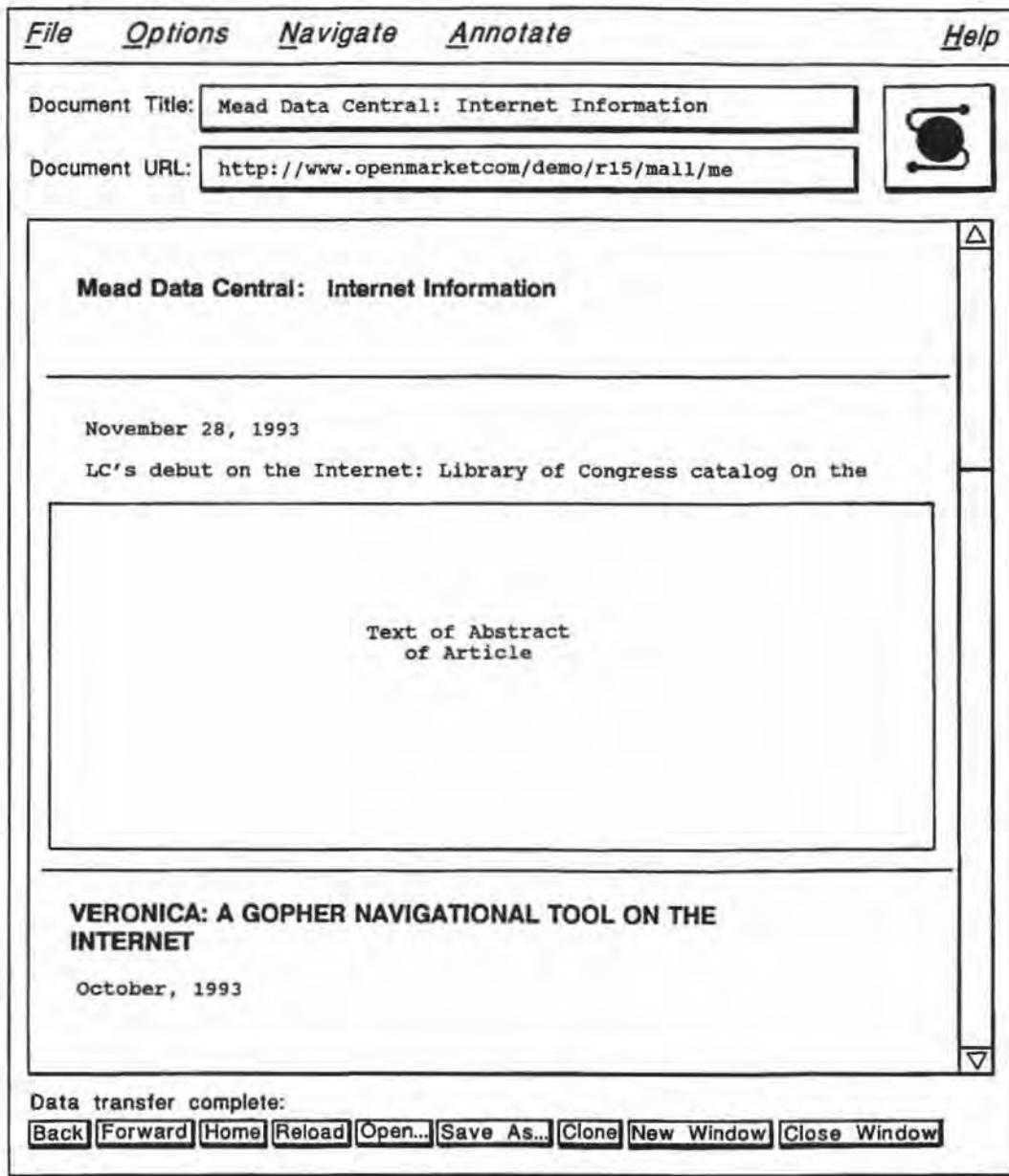


FIG. 5

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File Options Navigate Annotate Help

Document Title: Open Market Payment

Document URL: <http://payment.openmarket.com/ben/nph-payment>



Open Market Payment

You have selected an item that requires payment

Merchant:Test Merchant
Description:Mead Data Central Article
Amount:2.85(US currency)

If you have an Open Market account click on "continue" below and you will be prompted for your account name and password. If you do not have an account, you can establish one on-line and return to this page to continue your purchase.

an account on-line
 with payment transaction.

NOTE:For demonstrations use the account name `testuser@openmarket.com` with the password `testuser`.

Open Market, Inc.

Data transfer complete:
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FIG. 6

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File Options Navigate Annotate Help

Document Title: Establish OpenMarket Account

Document URL: <http://payment.openmarket.com/service/destabli>

Card Number:

Expiration Date: (format MM/YY)

Check the appropriate boxes:

I am the owner of the above credit card.

The above address is also the billing address for this credit card.

Your OpenMarket account statement is available on-line. At your option you may a copy of your statement automatically sent to your e-mail address at weekly or monthly intervals. Please choose a statement option.

Weekly statements Monthly statements No e-mail statements

Account name and password

Please choose an account name and password for your OpenMarket account. We suggest using an account name that is unique and easy to remember such as your e-mail address. Your password should be 8 characters or longer.

Account Name

Password

Data transfer complete:

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FIG. 7

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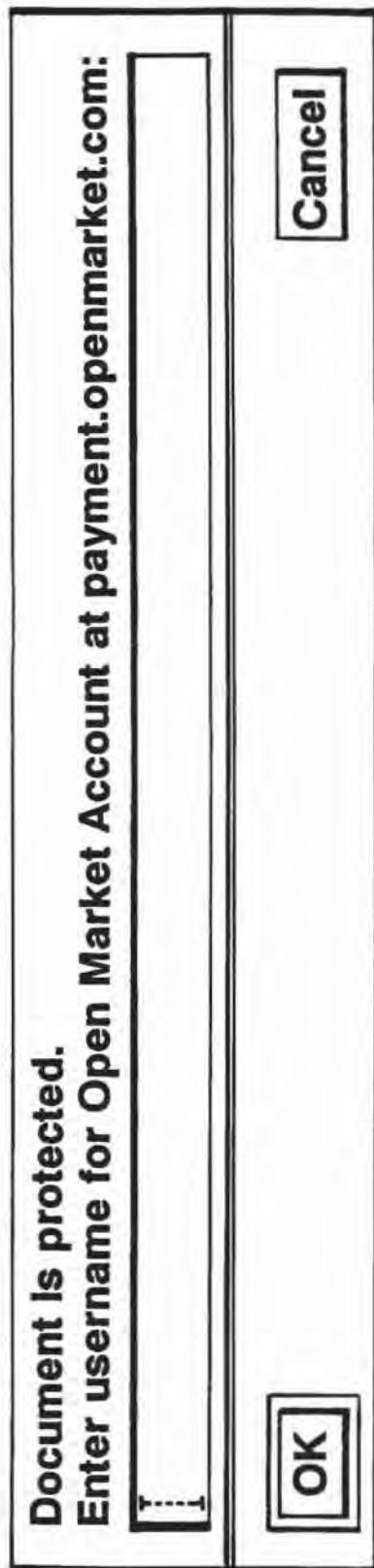


FIG. 8

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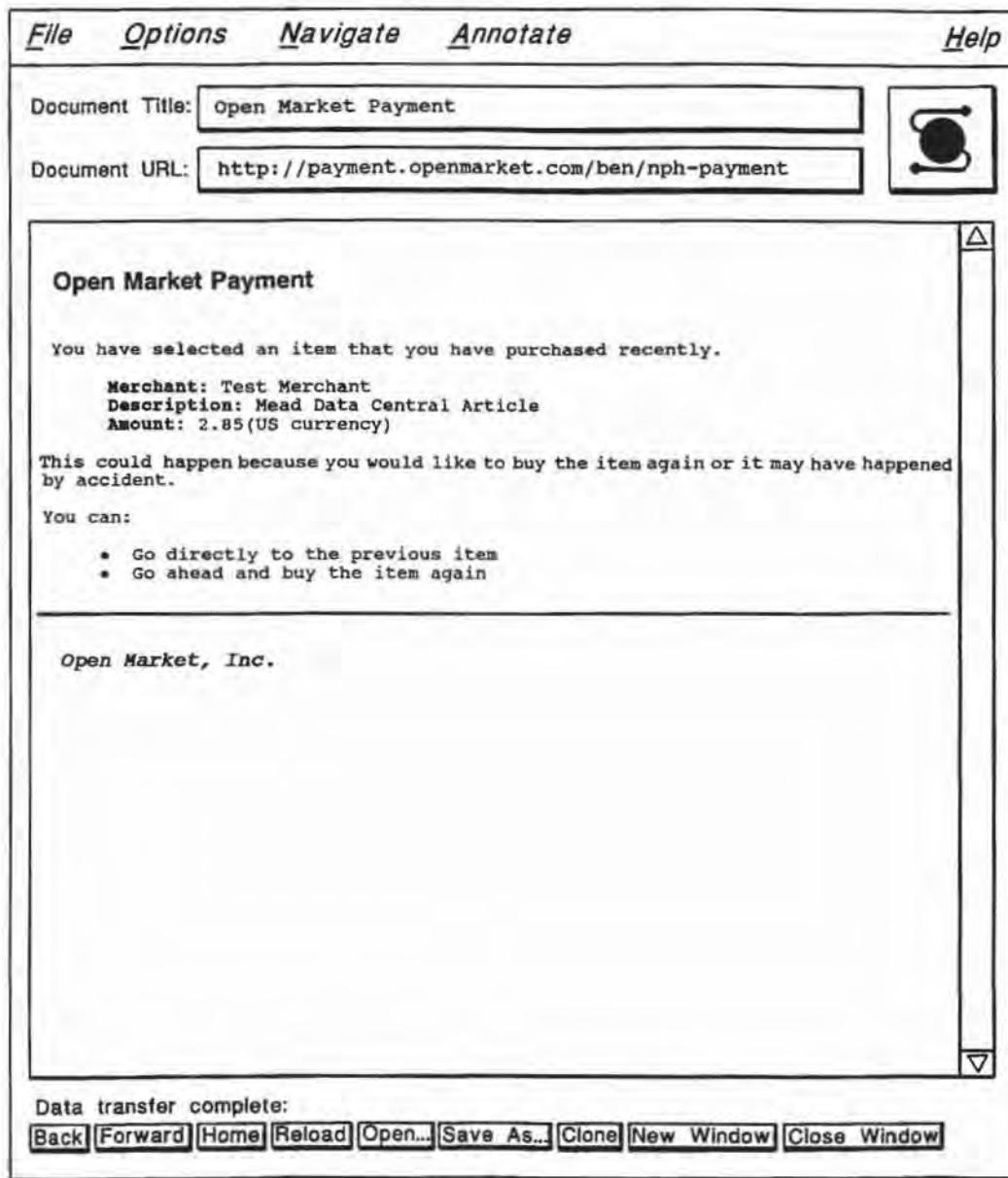


FIG. 9

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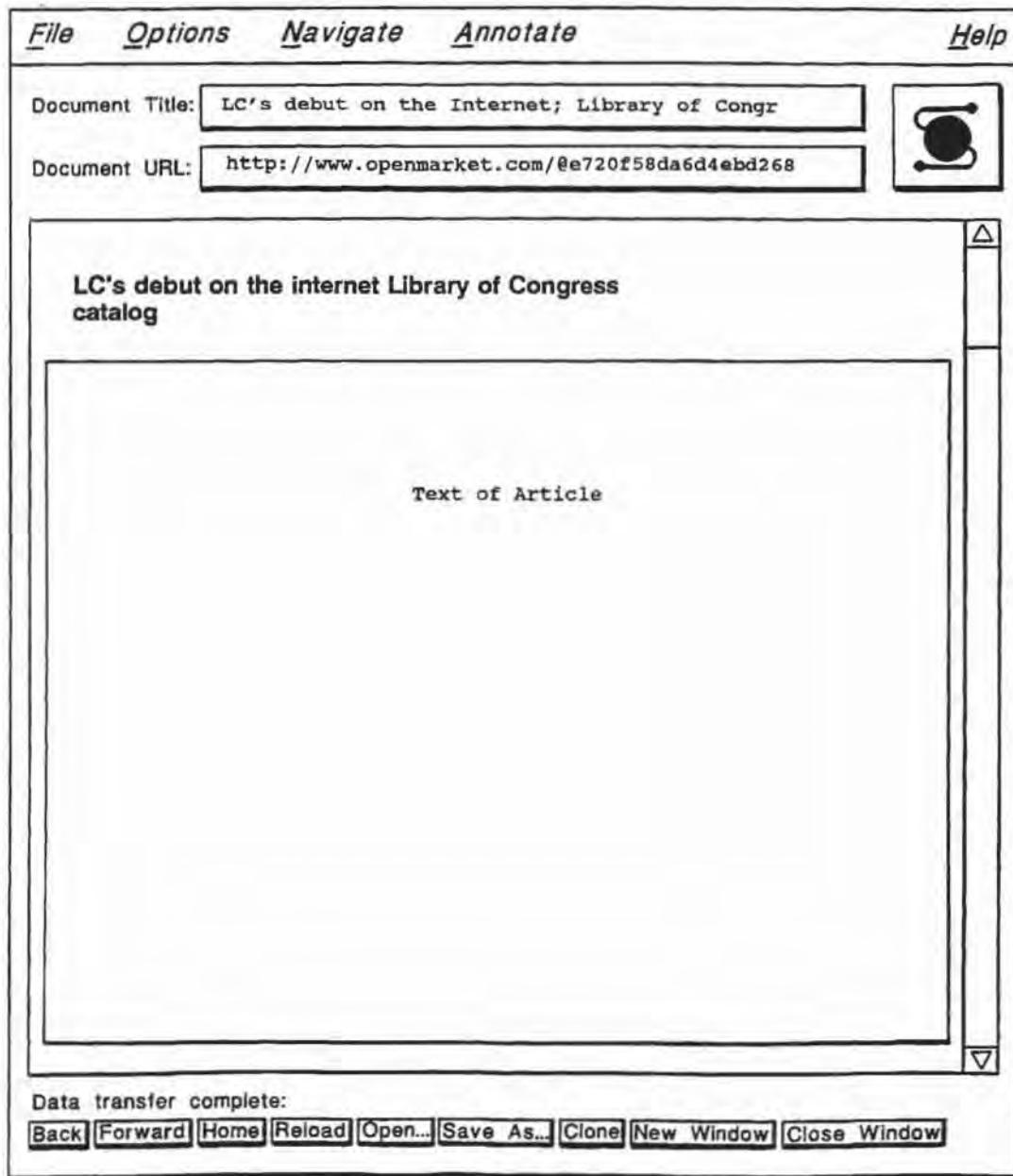


FIG. 10

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File Options Navigate Annotate Help

Document Title: Smart Statement for Test User

Document URL: <http://payment.openmarket.com/in/nph-stateme>



Information about the item.

Transactions in October 1994

Mon Oct 3 Test Merchant Dilbert subscription 20 seconds amount \$0.10
Tue Oct 4 Test Merchant Mead Data Central Article amount \$2.95
Tue Oct 4 Test Merchant Mead Data Central Article amount \$2.95
Tue Oct 4 Test Merchant Mead Data Central Article amount \$2.95
Tue Oct 4 Test Merchant N.Y. Times Article amount \$0.50
Tue Oct 4 Test Merchant Mead Data Central Article amount \$2.95
Wed Oct 5 Test Merchant Mead Data Central Article amount \$2.95
Wed Oct 5 Test Merchant Mead Data Central Article amount \$2.95
Wed Oct 5 Test Merchant Mead Data Central Article amount \$2.95
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Wed Oct 5 Test Merchant Mead Data Central Article amount \$2.95
Wed Oct 5 Test Merchant Mead Data Central Article amount \$2.95
Wed Oct 5 Test Merchant Mead Data Central Article amount \$2.95
Your total is 33.05.

Previous Statements

- September 1994
- August 1994

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FIG. 11

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File Options Navigate Annotate Help

Document Title: Smart Statement Detail

Document URL: <http://payment.openmarket.com/@c632f154cc8021>

Smart Statement Detail

This is the detailed information about a particular transaction from your Smart Statement

Transaction Information

```
url: http://www.openmarket.com/demos/aug15/mall/mead-fingerprint/mkarticle.cgi
transaction_log_id: 50254.0
currency: US
transaction_date: 781377633
initiator: 1.0
expiration: 2592000
description: Mead Data Central Article
amount: 2.95
beneficiary: 3.0
ip_address: 199.170.183.13
transaction_type.p
domain: mead.internet-1
```

Merchant Information

```
telephone: 617-621-9501
address_1: Open Market, Inc.
address_2: 215 First Street
fax: 617-621-1703
address_3: Cambridge, MA
email: testmerchant@openmarket.com
principal_name: Test Merchant
```

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FIG. 12

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File Options Navigate Annotate Help

Document Title: Smart Statement Detail

Document URL: <http://payment.openmarket.com/0c632f154cc8021>



```
url: http://www.openmarket.com/demos/aug15/mall/mead-fingerprint/mkaricle.cgi
transaction_log_id: 50254.0
currency: US
transaction_date: 781377633
initiator: 1.0
expiration: 2592000
description: Mead Data Central Article
amount: 2.95
beneficiary: 1.0
ip_address: 199.170.183.13
transaction_type.p
domain: mead.internet-1
```

Merchant Information

```
telephone: 617-621-9501
address_1: Open Market, Inc.
address_2: 215 First Street
fax: 617-621-1703
address_3: Cambridge, MA
email: testmerchant@openmarket.com
principal_name: Test Merchant
home_url:
country: US
postal_code: 02142
```

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FIG. 13

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File Options Navigate Annotate Help

Document Title: 

Document URL:

Or if you prefer, you can send your comments via electronic mail to feedback@openmarket.com or via FAX to +1.617.621.1703. If you would like a reply please include your e-mail address.

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Your E-mail address (optional):

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FIG. 14

NETWORK SALES SYSTEM**CROSS REFERENCE TO RELATED APPLICATION**

This is a continuation of U.S. patent application Ser. No. 08/328,133, filed Oct. 24, 1994, now U.S. Pat. No. 5,715,314.

REFERENCE TO MICROFICHE APPENDICES

Microfiche Appendices A-G are being submitted with the present application, being 4 sheets with 220 total pages.

BACKGROUND OF THE INVENTION

This invention relates to user-interactive network sales systems for implementing an open marketplace for goods or services over computer networks such as the Internet.

U.S. patent application Ser. No. 08/168,519, filed Dec. 16, 1993 by David K. Gifford and entitled "Digital Active Advertising," now abandoned, the entire disclosure of which is hereby incorporated herein in its entirety by reference, describes a network sales system that includes a plurality of buyer computers, a plurality of merchant computers, and a payment computer. A user at a buyer computer asks to have advertisements displayed, and the buyer computer requests advertisements from a merchant computer, which sends the advertisements to the buyer computer. The user then requests purchase of an advertised product, and the buyer computer sends a purchase message to the merchant computer. The merchant computer constructs a payment order that it sends to the payment computer, which authorizes the purchase and sends an authorization message to the merchant computer. When the merchant computer receives the authorization message it sends the product to the buyer computer.

The above-mentioned patent application also describes an alternative implementation of the network sales system in which, when the user requests purchase of an advertised product, the buyer computer sends a payment order directly to the payment computer, which sends an authorization message back to the buyer computer that includes an unforgeable certificate that the payment order is valid. The buyer computer then constructs a purchase message that includes the unforgeable certificate and sends it to the merchant computer. When the merchant computer receives the purchase request it sends the product to the buyer computer, based upon the pre-authorized payment order.

SUMMARY OF THE INVENTION

In one aspect, the invention provides a network-based sales system that includes at least one buyer computer for operation by a user desiring to buy a product, at least one merchant computer, and at least one payment computer. The buyer computer, the merchant computer, and the payment computer are interconnected by a computer network. The buyer computer is programmed to receive a user request for purchasing a product, and to cause a payment message to be sent to the payment computer that comprises a product identifier identifying the product. The payment computer is programmed to receive the payment message, to cause an access message to be created that comprises the product identifier and an access message authenticator based on a cryptographic key, and to cause the access message to be sent to the merchant computer. The merchant computer is programmed to receive the access message, to verify the access message authenticator to ensure that the access

message authenticator was created using the cryptographic key, and to cause the product to be sent to the user desiring to buy the product.

The invention provides a simple design architecture for the network sales system that allows the merchant computer to respond to payment orders from the buyer computer without the merchant computer having to communicate directly with the payment computer to ensure that the user is authorized to purchase the product and without the merchant computer having to store information in a database regarding which buyers are authorized to purchase which products. Rather, when the merchant computer receives an access message from the buyer computer identifying a product to be purchased, the merchant computer need only check the access message to ensure that it was created by the payment computer (thereby establishing for the merchant computer that the buyer is authorized to purchase the product), and then the merchant computer can cause the product to be sent to the buyer computer who has been authorized to purchase the product.

In another aspect, the invention features a network-based sales system that includes at least one buyer computer for operation by a user desiring to buy products, at least one shopping cart computer, and a shopping cart database connected to the shopping cart computer. The buyer computer and the shopping cart computer are interconnected by a computer network. The buyer computer is programmed to receive a plurality of requests from a user to add a plurality of respective products to a shopping cart in the shopping cart database, and, in response to the requests to add the products, to send a plurality of respective shopping cart messages to the shopping cart computer each of which includes a product identifier identifying one of the plurality of products. The shopping cart computer is programmed to receive the plurality of shopping cart messages, to modify the shopping cart in the shopping cart database to reflect the plurality of requests to add the plurality of products to the shopping cart, and to cause a payment message associated with the shopping cart to be created. The buyer computer is programmed to receive a request from the user to purchase the plurality of products added to the shopping cart and to cause the payment message to be activated to initiate a payment transaction for the plurality of products added to the shopping cart.

In another aspect, the invention features a network-based link message system that includes at least one client computer for operation by a client user and at least one server computer for operation by a server user. The client computer and the server computer are interconnected by a computer network. The client computer is programmed to send an initial link message to the server computer. The server computer is programmed to receive the initial link message from the client computer and to create, based on information contained in the initial link message, a session link message that encodes a state of interaction between the client computer and the server computer. The session link message includes a session link authenticator, computed by a cryptographic function of the session link contents, for authenticating the session link message. The server computer is programmed to cause the session link message to be sent to the client computer. The client computer is programmed to cause the session link message to be sent to a computer in the network that is programmed to authenticate the session link message by examining the session link authenticator and that is programmed to respond to the session link message based on the state of the interaction between the client computer and the server computer.

In another aspect, the invention features a network-based sales system that includes a merchant database having a plurality of digital advertisements and a plurality of respective product fulfillment items, at least one creation computer for creating the merchant database, and at least one merchant computer for causing the digital advertisements to be transmitted to a user and for causing advertised products to be transmitted to the user. The creation computer and the merchant computer are interconnected by a computer network. The creation computer is programmed to create the merchant database, and to transmit the digital advertisements and the product fulfillment items to the merchant computer. The merchant computer is programmed to receive the digital advertisements and product fulfillment items, to receive a request for a digital advertisement from a user, to cause the digital advertisement to be sent to the user, to receive from the user an access message identifying an advertised product, and to cause the product to be sent to the user in accordance with a product fulfillment item corresponding to the product.

In another aspect, the invention features a hypertext statement system that includes a client computer for operation by a client user and one or more server computers for operation by a server user. The client computer and the server computers are interconnected by a computer network. At least one of the server computers is programmed to record purchase transaction records in a database. Each of the purchase transaction records includes a product description. The server computer is programmed to transmit a statement document that includes the purchase transaction records to the client computer. The client computer is programmed to display the product descriptions, to receive a request from the client user to display a product corresponding to a product description displayed by the client computer, and to cause a product hypertext link derived from a purchase transaction record to be activated. At least one of the server computers is programmed to respond to activation of the product hypertext link by causing the product to be sent to the client computer.

In another aspect, the invention features a network payment system that includes at least one buyer computer for operation by a user desiring to buy a product and at least one payment computer for processing payment messages from the buyer computer. The buyer computer and the payment computer are interconnected by a computer network. The buyer computer is programmed to cause a payment message to be sent to the payment computer. The payment message includes a product identifier identifying the product that the user desires to buy. The payment computer is programmed to receive the payment message, to cause an access message to be created to enable the user to access the product, and to record a purchase transaction record in the settlement database. The buyer computer is programmed to cause a request for purchase transaction records to be sent to the payment computer. The payment computer is programmed to receive the request for purchase transaction records and to cause a document derived from the purchase transaction records to be sent to the buyer computer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a network sales system in accordance with the present invention.

FIG. 2 (2-A through 2-I) is a flowchart diagram illustrating the operation of a purchase transaction in the network sales system of FIG. 1.

FIG. 3 (3-A through 3-B) is a flowchart diagram illustrating the use of a shopping cart for the purchase of products in connection with the network sales system of FIG. 1.

FIG. 4 (4-A through 4-C) is a flowchart diagram illustrating the operation of a smart statement in the network sales system of FIG. 1.

FIG. 5 is a screen snapshot of an advertising document that the merchant computer sends to the buyer computer in FIG. 2.

FIG. 6 is a screen snapshot of a confirmation document that the payment computer sends to the buyer computer in FIG. 2.

FIG. 7 is a screen snapshot of a new account document that the payment computer sends to the buyer computer in FIG. 2.

FIG. 8 is a screen snapshot of an account name prompt that the buyer computer creates in FIG. 2.

FIG. 9 is a screen snapshot of a document that the payment computer sends to the buyer computer in FIG. 2 and that provides an option either to repurchase or to use a previously purchased access.

FIG. 10 is a screen snapshot of a fulfillment document that the merchant computer sends to the buyer computer in FIG. 2.

FIG. 11 is a screen snapshot of a smart statement document that the payment computer sends to the buyer computer in FIG. 4.

FIGS. 12 and 13 are screen snapshots of a transaction detail document that the payment computer sends to the buyer computer in FIG. 4.

FIG. 14 is a screen snapshot of a customer service form that the payment computer sends to the buyer computer in FIG. 4.

DETAILED DESCRIPTION

With reference to FIG. 1, a network sales system in accordance with the present invention includes a buyer computer 12 operated by a user desiring to buy a product, a merchant computer 14, which may be operated by a merchant willing to sell products to the buyer or by a manager of the network sales system, a payment computer 16 typically operated by a manager of the network sales system, and a creation computer 20 typically operated by the merchant. The buyer, merchant, payment, and creation computers are all inter-connected by a computer network 10 such as the Internet.

Creation computer 20 is programmed to build a "store" of products for the merchant. A printout of a computer program for use in creating such a "store" in accordance with the present invention is provided as Appendix F.

The products advertised by merchant computer 14 may be, for example, newspaper or newsletter articles available for purchase by buyers. Creation computer 20 creates a digital advertisement database 18 that stores advertising documents (which may for example be in the form of summaries of newspaper or newsletter articles, accompanied by prices) and product fulfillment items (which may be the products themselves if the products can be transmitted over the network, or which may be hard goods identifiers if the products are hard goods, i.e., durable products as opposed to information products). Creation computer 20 transmits contents of the advertising document database 18 to merchant computer 14 to enable the merchant computer to cause advertisements and products to be sent to buyers. Merchant computer 14 maintains advertising documents locally in advertising document database 15. In an alternative embodiment, the creation computer does not have a local digital advertisement database, but instead updates a remote

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advertising document database on a merchant computer. These updates can be accomplished using HTML forms or other remote database technologies as is understood by practitioners of the art.

Payment computer 16 has access to a settlement database 22 in which payment computer 16 can record details of purchase transactions. The products may be organized into various "domains" of products, and payment computer 16 can access settlement database 22 to record and retrieve records of purchases of products falling within the various domains. Payment computer 16 also has access to a shopping cart database 21 in which a "shopping cart" of products that a user wishes to purchase can be maintained as the user shops prior to actual purchase of the contents of the shopping cart.

With reference to FIG. 2, a purchase transaction begins when a user at buyer computer 12 requests advertisements (step 24) and buyer computer 12 accordingly sends an advertising document URL (universal resource locator) to merchant computer 14 (step 26). The merchant computer fetches an advertising document from the advertising document database (step 28) and sends it to the buyer computer (step 30). An example of an advertising document is shown in FIG. 5. Details of URLs and how they are used are found in Appendix G.

The user browses through the advertising document and eventually requests a product (step 32). This results in the buyer computer sending payment URL A to the payment computer (step 34). Payment URL A includes a product identifier that represents the product the user wishes to buy, a domain identifier that represents a domain of products to which the desired product belongs, a payment amount that represents the price of the product, a merchant computer identifier that represents merchant computer 14, a merchant account identifier that represents the particular merchant account to be credited with the payment amount, a duration time that represents the length of time for which access to the product is to be granted to the user after completion of the purchase transaction, an expiration time that represents a deadline beyond which this particular payment URL cannot be used, a buyer network address, and a payment URL authenticator that is a digital signature based on a cryptographic key. The payment URL authenticator is a hash of other information in the payment URL, the hash being defined by a key shared by the merchant and the operator of the payment computer.

In an alternative embodiment, step 34 consists of the buyer computer sending a purchase product message to the merchant computer, and the merchant computer provides payment URL A to the buyer computer in response to the purchase product message. In this alternative embodiment, payment URL A contains the same contents as above. The buyer computer then sends the payment URL A it has received from the merchant computer to the payment computer.

When the payment computer receives the payment URL it verifies whether the payment URL authenticator was created from the contents of the payment URL using the cryptographic key (step 36). If not, the payment computer sends a document to the buyer computer indicating that access to the network sales system is denied (step 38). Otherwise, the payment computer determines whether the expiration time has past (step 40). If it has, the payment computer sends a document to the buyer computer indicating that the time has expired (step 41). Otherwise, the payment computer checks the buyer computer network

address to see if it matches the one specified in the payment URL (step 42). If it does not match, the payment computer sends a document to the buyer computer indicating that access to the network payment system is denied (step 43).

Otherwise, the payment computer sends a payment confirmation document to the buyer computer, the payment confirmation document including an "open" link and a "continue" link (step 44).

An example of a confirmation document is shown in FIG. 10. The confirmation document asks the user to click on a "continue" button if the user already has an account with the payment computer, or to click on an "open" button if the user does not already have an account and wishes to open one.

If the user clicks on the "open" button (step 46), the buyer computer sends payment URL C to the payment computer (step 48), payment URL C being similar to payment URL A but also indicating that the user does not yet have an account. The payment computer creates a new account document (step 50) and sends it to the buyer computer (step 52). An example of a new account document is shown in FIG. 7.

When the user receives the new account document he enters the new account name, an account password, a credit card number, the credit card expiration date, and security information such as the maiden name of the user's mother (step 54), and presses a "submit" button (not shown in FIG. 7). The buyer computer sends the new account information to the payment computer (step 56), which enters the new account in the settlement database (step 58).

If the user clicks on the "continue" button (step 60), the buyer computer sends payment URL B to the payment computer (step 62), payment URL B being similar to payment URL A but also indicating that the user already has an account. The payment computer then instructs the buyer computer to provide the account name and password (steps 64 and 66), and the buyer computer prompts the user for this information by creating an account name prompt (example shown in FIG. 8) and a similar password prompt. The user enters the information (step 68) and the buyer computer sends the account name and password to the payment computer (step 70).

The payment computer verifies whether the user name and password are correct (step 72). If they are not correct, the payment computer sends a document to the buyer computer indicating that access to the network sales system is denied (step 74). Otherwise, the payment computer determines whether additional security is warranted, based on, e.g., whether the payment amount exceeds a threshold (step 73).

If additional security is warranted, the payment computer creates a challenge form document and sends it to the buyer computer (step 75). The user enters the security information (step 77), the buyer computer sends the security information to the payment computer (step 79), and the payment computer determines whether the security information is correct (step 81). If it is not correct, the payment computer sends a document to the buyer computer indicating that access to the network sales system is denied (step 83).

If the security information is correct, or if additional security was not warranted, the payment computer checks the settlement database to determine whether the user has unexpired access to the domain identifier contained in the payment URL (step 82). If so, the payment computer sends to the buyer computer a document providing an option either to repurchase or to use the previously purchased access (step 84). An example of such a document is shown in FIG. 9. The

user can respond to the recent purchase query document by choosing to access the previously purchased document (step 85) or to go ahead and buy the currently selected product (step 86).

If the user chooses to access the previously purchased document, the buyer computer skips to step 92 (see below). If the user chooses to buy the currently selected product, the payment computer calculates an actual payment amount that may differ from the payment amount contained in the payment URL (step 87). For example, the purchase of a product in a certain domain may entitle the user to access other products in the domain for free or for a reduced price for a given period of time.

The payment computer then verifies whether the user account has sufficient funds or credit (step 76). If not, the payment computer sends a document to the buyer computer indicating that the user account has insufficient funds (step 78). Otherwise, the payment computer creates an access URL (step 80) that includes a merchant computer identifier, a domain identifier, a product identifier, an indication of the end of the duration time for which access to the product is to be granted, the buyer network address, and an access URL authenticator that is a digital signature based on a cryptographic key. The access URL authenticator is a hash of other information in the access URL, the hash being defined by a key shared by the merchant and the operator of the payment computer. The payment computer then records the product identifier, the domain, the user account, the merchant account, the end of duration time, and the actual payment amount in the settlement database (step 88).

The payment computer then sends a redirect to access URL to the buyer computer (step 90), which sends the access URL to the merchant computer (step 92). The merchant computer verifies whether the access URL authenticator was created from the contents of the access URL using the cryptographic key (step 94). If not, the merchant computer sends a document to the buyer computer indicating that access to the product is denied (step 96).

Otherwise, the merchant computer verifies whether the duration time for access to the product has expired (step 98). This is done because the buyer computer can request access to a purchased product repeatedly. If the duration time has expired, the merchant computer sends a document to the buyer computer indicating that the time has expired (step 100). Otherwise the merchant computer verifies that the buyer computer network address is the same as the buyer network address in the access URL (step 101), and if so, sends a fulfillment document to the buyer computer (step 102), which is displayed by the buyer computer (step 104). An example of a fulfillment document is shown in FIG. 10. Otherwise, the merchant computer sends a document to the buyer computer indicating that access is not allowed (step 103).

With reference now to FIG. 3, when the merchant computer sends the advertising document to the buyer computer, the user may request that a product be added to a shopping cart in the shopping cart database rather than request that the product be purchased immediately. The buyer computer sends a shopping cart URL to the payment computer (step 108), the shopping cart URL including a product identifier, a domain identifier, a payment amount, a merchant computer identifier, a merchant account identifier, a duration time, an expiration time, and a shopping cart URL authenticator that is a digital signature based on a cryptographic key. The shopping cart URL authenticator is a hash of other information in the shopping cart URL, the hash being defined by

a key shared by the merchant and the operator of the payment computer.

The payment computer verifies whether the shopping cart URL authenticator was created from the contents of the shopping cart URL using a cryptographic key (step 110). If not, the payment computer sends a document to the buyer computer indicating that access to the network sales system is denied (step 112). Otherwise, before any modification to a user's shopping cart is allowed, user authentication is performed (step 113) in a manner analogous to steps 40-81. Once the user is authenticated, the payment computer creates or updates a payment URL for the shopping cart (step 114).

The user then either requests more advertisements (step 15 24 in FIG. 2) and possibly adds another product to the shopping cart, requests display of the shopping cart (step 116), or requests purchase of the entire contents of the shopping cart (step 124). If the user requests display of the shopping cart (step 116), the buyer computer sends a fetch shopping cart request to the payment computer (step 118), and the payment computer and buyer computer (step 119) perform steps analogous to steps 64-81. The payment computer returns the contents of the shopping cart to the buyer computer (step 120), which displays the contents of the shopping cart (step 122). If the user requests that the entire contents of the shopping cart be purchased (step 124) the buyer computer causes the payment URL for the shopping cart to be activated (step 126) and the payment URL is processed in a manner analogous to the processing of payment URLs for individual products (beginning with step 36 in FIG. 2).

With reference now to FIG. 4, a user can request display of a "smart statement" that lists purchase transactions for a given month (step 128). When the buyer computer receives such a request, it sends a smart statement URL to the payment computer (step 130).

When the payment computer receives the smart statement URL, it verifies whether the smart statement URL authenticator was created from the contents of the smart statement URL using a cryptographic key (step 132). If not, the payment computer sends a document to the buyer computer indicating that access is denied (step 134). Otherwise, the payment computer checks to determine whether the buyer network address in the smart statement URL matches the buyer computer's actual network address (step 136). If not, the payment computer sends a document to the buyer computer indicating that access is denied (step 138). Otherwise (step 140), the payment computer and buyer computer perform a set of steps analogous to steps 64-81 in FIG. 2 (payment computer requests account name and password, user provides the requested information, and payment computer verifies the information).

In an alternative embodiment steps 132-138 are omitted.

After verification of account information is complete, the payment computer retrieves the requested settlement data from the settlement database, creates a smart statement document for the buyer, and sends the smart statement document to the buyer computer (step 142). An example of a smart statement document is shown in FIG. 11. Each purchase transaction record in the smart statement document includes the date of the transaction, the name of the merchant, an identification of the product, and the payment amount for the product. The smart statement document also includes a transaction detail URL for each purchase transaction (these URLs, or hypertext links, are discussed below and are not shown in FIG. 11). The smart statement docu-

ment also identifies previous statements that the user may wish to have displayed.

The buyer computer displays the retrieved document (step 144), and the user may request transaction details for a particular transaction listed on the smart statement (step 146). If so, the buyer computer sends a transaction detail URL (or "payment detail URL") to the payment computer (step 148). The transaction detail URL includes a transaction identifier, a buyer network address, and a transaction detail URL authenticator. When the payment computer receives the transaction detail URL, it performs (step 150) a set of steps analogous to steps 132-140 (verification of URL authenticator, buyer network address, and account information). The payment computer then retrieves from the settlement database data corresponding to the payment transaction specified in the transaction detail URL, creates a transaction detail document, and sends it to the buyer computer (step 152).

An example of a transaction detail document is shown in FIGS. 12 and 13. The document displays a number of items of information about the transaction, including the transaction date, end of the duration time ("expiration"), a description of the product, the payment amount, the domain corresponding to the product, an identification of the merchant, and the merchant's address.

The smart statement document and the transaction detail document both include customer service URLs (hypertext links) that allow the user to request customer service (i.e., to send comments and suggestions to the payment computer). When the user requests customer service (step 154), the buyer computer sends the customer service URL to the payment computer (step 156), which creates a customer service form and sends it to the buyer computer (step 158). An example of a customer service form is shown in FIG. 14. The user types comments into the customer service form (step 160), and the buyer computer sends the user's comments to the payment computer (step 162). The payment computer then posts the user comments and sends a thank you document to the buyer computer (step 164).

A user may request display of a product included in the smart statement. When the user requests that the product be displayed (step 166), the buyer computer sends the access URL contained in the smart statement document to the merchant computer (step 168), and the buyer computer and merchant computer perform a set of steps analogous to steps 94-104 in FIG. 2 (authentication of access URL, verification whether duration time has expired, verification of buyer network address, and transmission of fulfillment document to buyer computer).

Whenever the present application states that one computer sends a URL to another computer, it should be understood that in preferred embodiments the URL is sent in a standard HTTP request message, unless a URL message is specified as a redirection in the present application. The request message includes components of the URL as described by the standard HTTP protocol definition. These URL components in the request message allow the server to provide a response appropriate to the URL. The term "URL" as used in the present application is an example of a "link," which is a pointer to another document or form (including multimedia documents, hypertext documents including other links, or audio/video documents).

When the present application states that one computer sends a document to another computer, it should be understood that in preferred embodiments the document is a success HTTP response message with the document in the

body of the message. When the present application states that a server sends an account name and password request message to the client, it should be understood that in preferred embodiments the account name and password request message is an unauthorized HTTP response. A client computer sends account name and password information to a server as part of a request message with an authorization field.

The software architecture underlying the particular preferred embodiment is based upon the hypertext conventions of the World Wide Web. Appendix A describes the Hypertext Markup Language (HTML) document format used to represent digital advertisements, Appendix B describes the HTML forms fill out support in Mosaic 2.0, Appendix C is a description of the Hypertext Transfer Protocol (HTTP) between buyer and merchant computers, Appendix D describes how documents are named with Uniform Resource Locators (URLs) in the network of computers, and Appendix E describes the authentication of URLs using digital signatures.

A printout of a computer program for use in creating and operating such a "store" in accordance with the present invention is provided as Appendix F. A printout of a computer program for use in operating other aspects of the network sales system in accordance with the present invention is provided in Appendix G.

There has been described a new and useful network-based sales system. It is apparent that those skilled in the art may make numerous modifications and departures from the specific embodiments described herein without departing from the spirit and scope of the claimed invention.

What is claimed is:

1. A network-based sales system, comprising:
a merchant database comprising a plurality of digital advertisements and a plurality of respective product fulfillment items;
at least one creation computer for creating said merchant database; and
at least one merchant computer for causing said digital advertisements to be transmitted to a user and for causing advertised products to be transmitted to said user;
said creation computers, said merchant computer, and a payment computer being interconnected by a public packet switched computer network;
said creation computer being programmed to create said merchant database, and to transmit said digital advertisements and said product fulfillment items over said network to said merchant computer;
said merchant computer being programmed to receive said digital advertisements and product fulfillment items over said network, to receive over said network a request for a digital advertisement from a user, to cause said digital advertisement to be sent to said user over said network, to receive over said network from said user a product request message identifying an advertised product, to receive an access message over said network created by said payment computer, and to cause said product to be sent to said user in accordance with a product fulfillment item corresponding to said product and based upon receipt by the merchant computer of the access message.

2. A network-based sales system in accordance with claim 1, wherein each of said digital advertisements comprises an abstract of a product and a price.

3. A network-based sales system in accordance with claim 2, wherein:

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at least one of said product fulfillment items comprises a product itself; and
 said creation computer is programmed to transmit said product to said merchant computer with said digital advertisements.
 5 4. A network-based sales system in accordance with claim 2, wherein:
 at least one of said product fulfillment items comprises a hard good identifier; and
 said creation computer is programmed to transmit said hard good identifier to said merchant computer with
 10 said digital advertisements.
 5. A method of operating a merchant computer in a network-based sales system comprising a merchant database that comprises a plurality of digital advertisements and a plurality of respective product fulfillment items, at least one creation computer for creating said merchant database, and at least one merchant computer for causing said digital advertisements to be transmitted to a user and for causing advertised products to be transmitted to said user, and at
 15 least one payment computer, said creation computer, said merchant computer, and said payment computer being interconnected by a public packet switched computer network, said method comprising the steps of:
 receiving, at said merchant computer, said digital advertisements and said product fulfillment items, said digital advertisements and said product fulfillment items having been transmitted over said network to said merchant computer by said creation computer, said merchant database comprising said digital advertisements and said product fulfillment items having been created by said creation computer;
 20 receiving over said network a request for a digital advertisement from a user;
 causing said digital advertisement to be sent to said user over said network;
 receiving over said network from said user a product request message identifying an advertised product;
 receiving over said network an access message created by
 25 said payment computer; and
 causing said product to be sent to said user in accordance with a product fulfillment item corresponding to said product and based upon receipt by the merchant computer of the access message.
 30 6. A hypertext statement system, comprising:
 a client computer for operation by a client user; and
 a plurality of server computers for operation by a server user;
 said client computer and said server computers being
 35 interconnected by a public packet switched computer network;
 at least one of said server computers being programmed to record information pertaining to purchase transaction records in a database, each of said purchase transaction records comprising a product description, and to cause a statement document comprising said purchase transaction records to be transmitted to said client computer over said network;
 40 said client computer being programmed to display said product descriptions, to receive a request from said client user to display a product corresponding to a product description displayed by said client computer, and to cause a product hypertext link derived from a purchase transaction record to be activated;
 45 at least one of said server computers, other than a server computer that transmitted said statement document to
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said client computer, being programmed to respond to activation of said product hypertext link by causing said product to be sent to said client computer over said network.
 5 7. A hypertext statement system in accordance with claim 6, wherein:
 said client computer is programmed to receive a request from said client user to display transaction details corresponding to a product description displayed by said client computer and to cause a transaction detail hypertext link corresponding to said product description to be activated; and
 at least one of said server computers is programmed to respond to activation of said transaction detail hypertext link by transmitting said transaction details to said client computer as a transaction detail document.
 10 8. A hypertext statement system in accordance with claim 7, wherein:
 said transaction detail document further comprises a customer service form hypertext link;
 said client computer is programmed to receive a request from said client user to display a customer service form and to cause said customer service form hypertext link to be activated; and
 at least one of said server computers is programmed to respond to activation of said customer service form hypertext link by transmitting said customer service form to said client computer.
 15 9. A hypertext statement system in accordance with claim 6, wherein:
 said statement document further comprises a customer service form hypertext link;
 said client computer is programmed to receive a request from said client user to display a customer service form and to cause said customer service form hypertext link to be activated; and
 at least one of said server computers is programmed to respond to activation of said customer service form hypertext link by transmitting said customer service form to said client computer.
 20 10. A method of operating a server computer in a hypertext statement system comprising a client computer for operation by a client user, and a plurality of server computers for operation by a server user, said client computer and said server computers being interconnected by a public packet switched computer network, said method comprising the steps of:
 recording, at one of said server computers, information pertaining to purchase transaction records in a database, each of said purchase transaction records comprising a product description; and
 25 causing a statement document comprising said purchase transaction records to be transmitted to said client computer over said network;
 said client computer being programmed to display said product descriptions, to receive a request from said client user to display a product corresponding to a product description displayed by said client computer, and to cause a product hypertext link derived from a purchase transaction record to be activated;
 30 at least one of said server computers, other than a server computer that transmitted said statement document to said client computer, being programmed to respond to activation of said product hypertext link by causing said product to be sent to said client computer over said network.
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11. A network payment system, comprising:
 at least one buyer computer for operation by a user desiring to buy a product; and
 at least one payment computer for processing payment messages from said buyer computer;
 said buyer computer, said payment computer, and a merchant computer being interconnected by a public packet switched computer network;
 said buyer computer being programmed to cause a payment message to be sent to said payment computer over said network;
 said payment computer being programmed to receive said payment message, to cause an access message to be created for transmission over said network to said merchant computer to enable said user to access said product upon verification by said merchant computer that said access message was created by said payment computer, and to record information pertaining to a purchase transaction record in said settlement database;
 said buyer computer being programmed to cause a request for a purchase transaction record to be sent to said payment computer over said network; and
 said payment computer being programmed to receive said request for said purchase transaction record and to cause a document derived from said purchase transaction record to be sent to said buyer computer over said network.

12. The network payment system of claim 11 wherein the payment message comprises a product identifier identifying the product that the user desires to buy.

13. A method of operating a payment computer in a network payment system comprising at least one buyer computer for operation by a user desiring to buy a product, and at least one payment computer for processing payment messages from said buyer computer, and at least one merchant computer, said buyer computer, said payment computer, and said merchant computer being interconnected by a public packet switched computer network, said method comprising the steps of:

receiving, at said payment computer, a payment message that said buyer computer has caused to be sent to said payment computer over said network;
 causing an access message to be created for transmission to a merchant computer over said network to enable said user to access said product upon verification by said merchant computer that said access message was created by said payment computer;
 recording information pertaining to a purchase transaction record in said settlement database;
 receiving over said network a request for a purchase transaction record that said buyer computer has caused to be sent to said payment computer; and
 causing a document derived from said purchase transaction record to be sent to said buyer computer over said network.

14. The method of claim 13 wherein the payment message comprises a product identifier identifying the product that the user desires to buy.

15. A hypertext statement system, comprising:
 a client computer for operation by a client user; and
 one or more server computers for operation by a server user;
 the client computer and the server computers being interconnected by a public packet switched computer network;

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at least one of the server computers being programmed to record information pertaining to purchase transaction records in a database, and to transmit a statement document comprising the purchase transaction records to the client computer over the network;

the client computer being programmed to display the statement document to receive a request from the client user to display transaction details corresponding to a portion of the statement document displayed by the client computer, and to cause a transaction detail hypertext link corresponding to the portion of the statement document to be activated;

at least one of the server computers being programmed to respond to activation of the transaction detail hypertext link by transmitting the transaction details to the client computer over the network as a transaction detail document.

16. A method of operating a server computer in a hypertext statement system comprising a client computer for operation by a client user, and one or more server computers for operation by a server user, the client computer and the server computers being interconnected by a public packet switched computer network, the method comprising the steps of:

recording, at one of the server computers, information pertaining to purchase transaction records in a database; and

transmitting a statement document comprising the purchase transaction records to the client computer over the network;

the client computer being programmed to display the statement document, to receive a request from the client user to display transaction details corresponding to a portion of the statement document displayed by the client computer, and to cause a transaction detail hypertext link corresponding to the portion of the statement document to be activated;

at least one of the server computers being programmed to respond to activation of the transaction detail hypertext link by transmitting the transaction details to the client computer over the network as a transaction detail document.

17. A network-based sales system, comprising:

at least one buyer computer for operation by a user desiring to buy products;

at least one shopping cart computer; and

a shopping cart database connected to the shopping cart computer;

the buyer computer and the shopping cart computer being interconnected by a public packet switched computer network;

the buyer computer being programmed to receive a plurality of requests from a user to add a plurality of respective products to a shopping cart in the shopping cart database, and, in response to the requests to add the products, to send a plurality of respective shopping cart messages over the network to the shopping cart computer each of which comprises a product identifier identifying one of the plurality of products and at least one of which comprises a universal resource locator;

the shopping cart computer being programmed to receive the plurality of shopping cart messages, to modify the shopping cart in the shopping cart database to reflect the plurality of requests to add the plurality of products to the shopping cart, and to cause a payment message

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associated with the shopping cart to be created, the payment message comprising a universal resource locator; and
 the buyer computer being programmed to receive a request from the user to purchase the plurality of products added to the shopping cart and to cause the payment message to be activated to initiate a payment transaction for the plurality of products added to the shopping cart;
 the shopping cart being a stored representation of a collection of products, the shopping cart database being a database of stored representations of collections of products, and the shopping cart computer being a computer that modifies the stored representations of collections of products in the database.

18. A method of operating a shopping cart computer in a public packet switched computer network comprising at least one buyer computer for operation by a user desiring to buy products, at least one shopping cart computer, and a shopping cart database connected to the shopping cart computer, the method comprising the steps of:

receiving, at the shopping cart computer, a plurality of shopping cart messages sent over the network to the shopping cart computer by the buyer computer in response to receipt of a plurality of requests from a user to add a plurality of respective products to a shopping cart in the shopping cart database, each of the shopping cart messages comprising a product identifier identifying one of the plurality of products and at least one of which comprises a universal resource locator;

modifying the shopping cart in the shopping cart database to reflect the plurality of requests to add the plurality of products to the shopping cart; and
 causing a payment message associated with the shopping cart to be created, the payment message comprising a universal resource locator;

the buyer computer being programmed to receive a request from the user to purchase the plurality of products added to the shopping cart and to cause the payment message to be activated to initiate a payment transaction for the plurality of products added to the shopping cart;

the shopping cart being a stored representation of a collection of products, the shopping cart database being a database of stored representations of collections of products, and the shopping cart computer being a computer that modifies the stored representations of collections of products in the database.

19. A network-based sales system, comprising:
 at least one buyer computer for operation by a user desiring to buy a product;
 at least one merchant computer; and
 at least one payment computer;

the buyer computer, the merchant computer, and the payment computer being interconnected by a computer network;

the buyer computer being programmed to receive a user request for purchasing a product, and to cause a payment message to be sent to the payment computer that comprises a product identifier identifying the product; the payment computer being programmed to receive the payment message, to cause an access message to be created that comprises a product identifier identifying the product and an access message authenticator based on a cryptographic key, and to cause the access message to be sent to the merchant computer; and

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the merchant computer being programmed to receive the access message, to cause the access message authenticator to be verified to ensure that the access message authenticator was created using the cryptographic key, and to cause the product to be received by the user desiring to buy the product.

20. A network-based sales system in accordance with claim 19 wherein the buyer computer is programmed to cause the payment message to be sent to the payment computer by sending a purchase product message to the merchant computer, the merchant computer being programmed to receive the purchase product message, and in response thereto, to send the payment message to the payment computer.

21. A network-based sales system in accordance with claim 19 wherein the merchant computer is programmed itself to verify the access message authenticator.

22. A network-based sales system in accordance with claim 19 wherein the merchant computer is programmed to cause every access message authenticator received by the merchant computer to be verified.

23. A network-based sales system in accordance with claim 19, wherein the payment message comprises a payment amount.

24. A network-based sales system in accordance with claim 19, wherein the payment computer is programmed to record the product identifier and the payment amount.

25. A network-based sales system in accordance with claim 24, wherein the product identifier and the payment amount are recorded in a settlement database.

26. A network-based sales system in accordance with claim 19, wherein the payment message comprises a merchant computer identifier.

27. A network-based sales system in accordance with claim 19, wherein the payment message comprises a payment message authenticator based on a cryptographic key.

28. A network-based sales system in accordance with claim 27, wherein the payment computer is programmed to verify the payment message authenticator to ensure that the payment message authenticator was created using the cryptographic key.

29. A network-based sales system in accordance with claim 19 wherein the computer network is a public packet-switched communications network.

30. A method of operating a payment computer in a computer network comprising at least one buyer computer for operation by a user desiring to buy a product, at least one merchant computer, and at least one payment computer, the method comprising the steps of:

receiving, at the payment computer, a payment message that the buyer computer has caused to be sent to the payment computer in response to a user request for purchasing a product, the payment message comprising a product identifier identifying the product;

causing an access message to be created that comprises a product identifier identifying the product and an access message authenticator based on a cryptographic key; and

causing the access message to be sent to the merchant computer, the merchant computer being programmed to receive the access message, to cause the access message authenticator to be verified to ensure that the access message authenticator was created using the cryptographic key, and to cause the product to be received by the user desiring to buy the product.

31. A network-based sales system, comprising:
 at least one buyer computer for operation by a user desiring to buy a product;

at least one merchant computer; and
at least one payment computer;
the buyer computer, the merchant computer, and the payment computer being interconnected by a public packet switched computer network;

the buyer computer being programmed to receive a request from a user for purchasing a product, and to cause a payment message to be sent over the network to the payment computer;

the payment computer being programmed to receive the payment message, and, if purchase of the product by the user has not been previously recorded in a settlement database, to cause the user to be charged for the product and to create a new record in the settlement database reflecting purchase of the product by the user, to cause an access message to be created, and to cause the access message to be sent over the network to the merchant computer; and

the merchant computer being programmed to receive the access message and to cause the user to receive the product.

32. The network-based sales system of claim 31 wherein: the payment computer is programmed to cause the access message to be created using a cryptographic key; and at least one of the computers is programmed to use the access message in a cryptographic process to ensure that the user has paid for the product.

33. A method of operating a payment computer in a public packet switched computer network comprising at least one buyer computer for operation by a user desiring to buy a product, at least one merchant computer, and at least one payment computer, the method comprising the steps of:

receiving, at the payment computer, a payment message that the buyer computer has caused to be sent over the network to the payment computer in response to a request from a user for purchasing a product, and, if purchase of the product by the user has not been previously recorded in a settlement database, causing the user to be charged for the product and creating a new record in the settlement database reflecting purchase of the product by the user;

causing an access message to be created; and

causing the access message to be sent over the network to the merchant computer, the merchant computer being programmed to receive the access message and to cause the user to receive the product.

34. The method of claim 33 wherein at least one of the computers is programmed to use the access message in a cryptographic process to ensure that the user has paid for the product.

35. A network-based sales system, comprising:

at least one buyer computer for operation by a user desiring to buy products;

at least one shopping cart computer; and

a shopping cart database connected to the shopping cart computer;

the buyer computer and the shopping cart computer being interconnected by a public packet switched computer network;

the buyer computer being programmed to receive a plurality of requests from a user to add a plurality of respective products to a shopping cart in the shopping cart database, and, in response to the requests to add the products, to send a plurality of respective shopping cart

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messages over the network to the shopping cart computer each of which comprises a product identifier identifying one of the plurality of products; the shopping cart computer being programmed to receive the plurality of shopping cart messages, and to modify the shopping cart in the shopping cart database to reflect the plurality of requests to add the plurality of products to the shopping cart; and

the buyer computer being programmed to receive a request from the user to purchase the plurality of products added to the shopping cart and to cause a payment message to be activated to initiate a payment transaction for the plurality of products added to the shopping cart;

the shopping cart being a stored representation of a collection of products, the shopping cart database being a database of stored representations of collections of products, and the shopping cart computer being a computer that modifies the stored representations of collections of products in the database.

36. A method of operating a shopping cart computer in a public packet switched computer network comprising at least one buyer computer for operation by a user desiring to buy products, at least one shopping cart computer, and a shopping cart database connected to the shopping cart computer, the method comprising the steps of:

receiving, at the shopping cart computer, a plurality of shopping cart messages sent over the network to the shopping cart computer by the buyer computer in response to receipt of a plurality of requests from a user to add a plurality of respective products to a shopping cart in the shopping cart database, each of the shopping cart messages comprising a product identifier identifying one of the plurality of products; and

modifying the shopping cart in the shopping cart database to reflect the plurality of requests to add the plurality of products to the shopping cart;

the buyer computer being programmed to receive a request from the user to purchase the plurality of products added to the shopping cart and to cause a payment message to be activated to initiate a payment transaction for the plurality of products added to the shopping cart;

the shopping cart being a stored representation of a collection of products, the shopping cart database being a database of stored representations of collections of products, and the shopping cart computer being a computer that modifies the stored representations of collections of products in the database.

37. A network-based sales system, comprising:

a merchant database comprising a plurality of digital advertisements and a plurality of respective product fulfillment items;

at least one creation computer for creating the merchant database; and

at least one merchant computer for causing the digital advertisements to be transmitted to a user and for causing advertised products to be transmitted to the user;

the creation computer and the merchant computer being interconnected by a public packet switched computer network;

the creation computer being programmed to create the merchant database, and to transmit the digital advertisements and the product fulfillment items over the network to the merchant computer;

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the merchant computer being programmed to receive the digital advertisements and product fulfillment items over the network, to receive over the network a request for a digital advertisement from a user, to cause the digital advertisement to be sent to the user over the network, to receive over the network from the user a product request message identifying an advertised product, and to cause the product to be sent to the user in accordance with a product fulfillment item corresponding to the product;

at least a portion of the digital advertisements transmitted by the creation computer to the merchant computer over the network being authenticated by at least one digital signature.

38. A method of operating a merchant computer in a network-based sales system comprising a merchant database that comprises a plurality of digital advertisements and a plurality of respective product fulfillment items, at least one creation computer for creating the merchant database, and at least one merchant computer for causing the digital advertisements to be transmitted to a user and for causing advertised products to be transmitted to the user, the creation computer and the merchant computer being interconnected by a public packet switched computer network, the method comprising the steps of:

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receiving, at the merchant computer, the digital advertisements and the product fulfillment items, the digital advertisements and the product fulfillment items having been transmitted over the network to the merchant computer by the creation computer, the merchant database comprising the digital advertisements and the product fulfillment items having been created by the creation computer;

receiving over the network a request for a digital advertisement from a user;

causing the digital advertisement to be sent to the user over the network;

receiving over the network from the user a product request message identifying an advertised product; and causing the product to be sent to the user in accordance with a product fulfillment item corresponding to the product;

at least a portion of the digital advertisements transmitted by the creation computer to the merchant computer over the network being authenticated by at least one digital signature.

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UNITED STATES PATENT AND TRADEMARK OFFICE
Certificate

Patent No. 5,909,492

Patented: June 1, 1999

On petition requesting issuance of a certificate for correction of inventorship pursuant to 35 U.S.C. 256, it has been found that the above identified patent, through error and without any deceptive intent, improperly sets forth the inventorship.

Accordingly, it is hereby certified that the correct inventorship of this patent is: Andrew C. Payne, Lincoln, MA (US); Lawrence C. Stewart, Wayland, MA (US); and G. Winfield Treese, Wayland, MA (US).

Signed and Sealed this Third Day of November 2009.

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